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DYNAMICS AND VARIATION OF REGIONAL FIRM FORMATION - CASE OF TURKEY –

PhD Thesis

BURHAN CAN KARAHASAN

Istanbul, 2010

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Marmara Üniversitesi
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To Mehmet and Ümran Karahasan

GENERAL KNOWLEDGE

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ABSTRACT

DYNAMICS AND VARIATION OF REGIONAL FIRM FORMATION - CASE OF TURKEY -

This dissertation aims to scrutinize the regional inequalities in Turkey from the view point of location choice of production. Location choice of production, measured by the number of new firms in different industries, is examined and its variation is explained by focusing on the social and economical properties of provinces. Theoretical insights offered by new economics of geography as well as contemporary discussion of knowledge based entrepreneurial models are used. Preliminary results about the variation of new firm start ups indicate that location choice of production is unequal among the geography of Turkey. The unequal dispersion of firm formation is linked with the regional differences via different panel data models. Overall findings of the dissertation confirm that local demand, financial development and human capital quality act as pull effects for the location choice of production. Meanwhile additional findings indicate that industrial interactions are not existent, that the firms in specific industries prefer to locate close to same industries. Finally further impact of spatial autocorrelation as well as role of geography is observed. Results validate that there is increasing spatial heterogeneity in location choice of production; leaving developed provinces more developed and less developed provinces less developed in terms of firm formation. This finding is also confirmed by investigation of the role of geography; that production prefers to locate in high market access areas of the western geography of Turkey. In general results of the dissertation pinpoints that, dispersion of the location choice of production is unequal among the provinces of Turkey and this dispersed picture shares the common pattern realized in regional inequalities in Turkey.

GENEL BİLGİLER

İsim ve Soyadı	**:** Burhan Can Karahasan
Anabilim Dalı	**:** İktisat (İng)
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Anahtar Kelimeler	**:**Bölgesel farklılıklar, firma oluşumu, mekansal analiz, mekansal ekonometri, panel veri modelleri,

ÖZET

FİRMA OLUŞUMUNUN BÖLGESEL FARKLILAŞMASI VE DİNAMİKLERİ - TÜRKİYE ÖRNEĞİ -

Bu tez Türkiye'de bölgesel farklılıkları üretimin mekan seçme davranışı üzerinden incelemeyi hedeflemiştir. Yeni firma sayıları ile tanımlanan üretimin mekan seçme davranışının bölgesel dağılımı ve bu dağılımın arkasında yatan sosyo-ekonomik nedenler il bazından incelenmiştir. Yeni coğrafya iktisadının kuramsal altyapısı ve bilgi yayılımı üzerinden çalışan girişimci bazlı büyüme modelleri kullanılmıştır. İlk bulgular firma oluşumunun, üretimin mekan seçme davranışının, Türkiye'nin coğrafyasında eşit olmayan bir şekilde dağıldığını göstermektedir. Bu dağınık yapı panel veri yöntemleri ile incelenmiştir. Tez çalışmasının sonuçları yerel talep, mali derinleşme ve eğitim kalitesinin firmaların mekan seçme davranışını etkilediğini göstermiştir. Buna ek olarak sektörel etkileşimin geçerli olmadığı, üretimin genel olarak aynı sanayi kollarına yakın mekan seçmeyi tercih ettikleri tespit edilmiştir. Son olarak mekansal oto korelasyon ve coğrafyanın rolü incelenmiştir. Bulgular Türkiye'de üretimin mekan seçme davranışında şiddetlenen bir mekansal heterojenlik olduğunu; firma oluşumu açısından gelişmiş bölgelerin daha çok geliştiği ve az gelişmişlerin az geliştiği bir yapının oluştuğunu göstermektedir. Bu bulgular coğrafyanın rolünün analiz edilmesi ile pekiştirilmiş ve üretimin piyasa potansiyelinin yüksek olduğu bölgeleri tercih ettiği tespit edilmiştir. Genel olarak tezin sonuçları Türkiye'de yeni firma oluşum sürecinin bölgeler arasında eşit dağılmadığı ve bu yapının Türkiye'deki genel bölgesel farklılıklar ile benzer bir yapıya sahip olduğu vurgulamaktadır.

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Burhan Can Karahasan

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1. Introduction

Regional differences stood at the centre of economics for a substantial time period. Inequalities and numerous reflections on the social and economical environment of nations are subject to endless discussions. From this point of view it is always a research matter for social scientists to understand the major reasons behind the unequal distribution of economic activity in different geographies. While regional economics dominate the literature, with increasing attention on other dimensions of regional differences, urban economics as well as trade theories start to participate in the regional inequalities discussion. Especially with the rise of new economics of geography (NEG), there is a tendency in the literature towards the usage of location concept in examining the regional inequalities phenomenon. This is where the location choice and regional differences are linked within the framework of regional inequalities. The explanation will be increasing level of output, increasing level of job creation or increasing level of knowledge transformation as an outcome of location choice. No matter which one dominates these three pillars make the investigation of the location choice of production an important area of study. In this sense, there are two different discussion points; one is the investigation of the already mentioned impact of location choice on regional differences and the other is focusing on the reasons behind the location choice of production. This dissertation will be investigating the latter. For a developing economy realizing high regional disparities this dissertation will first shed light on the dispersion of the location choice production among the geography of Turkey.

Next the study will evaluate the impact of regional properties on the location choice of production by offering different methodological insights.

1.1 Objective

This dissertation will be focusing on the regional variation of the location choice of production in Turkey. Both the variation as well as the reasons behind the variation will be investigated. This is at the end expected to give the reader a profound insight about the regional differences in Turkey from a different perspective.

While answering the central question of the dissertation, the reader will also have detailed information about the historical developments in the location theory. The interconnection between regional and urban economics, the contribution of the trade theories and the more recent augmentations of the new economics of geography (NEG) will be summarized. Moreover some contemporary growth models that both complement but also criticize the previously named theoretical frameworks will be introduced. Moreover before moving to the investigation of the central question, the dissertation also aims to give information about the regional differences in Turkey.

After reviewing the theoretical background and defining the regional structure of differences in Turkey, the central objective of the dissertation will be investigated by following distinct methodologies. Number of new firms will be regarded as the proper indicator to assess the location choice of production. This data will be investigated at three different economic

activities: manufacturing, services and trade. The variation and the dynamics of the new firm formation process is aimed to be observed first by assuming spatial randomness, next by including the role of geography and spatial association. In this sense the dissertation also aims to question the impact of geographical proximity in the regional firm formation differences in Turkey.

1.2 Theoretical Background

Theoretical background of the location choice phenomenon is tied to a number of different frameworks. Interaction between regional and urban economics to explain why economic activity, production is specific, prefers to locate in different localities is an inevitable starting point (Njkamps and Mills, 1986). Moreover recent developments realized in trade theories also validate the concerns of Isard (1954) that location concept can be linked with specialization (Krugman and Heplman, 1985, Grossman and Helpman, 1991).

The concept of location choice is investigated by the above mentioned distinct views however they mostly originate from the environment that is offered by von Thünen (1826). The exogenously formed isolated state of von Thünen (1826) later influenced urban economists like Hoover (1963), Alonso (1964) and Henderson (1974). Approach of the urban economists prefers to investigate how production locates inside and also outside the urban centers. However they mostly escape from explaining why that city centre evolves in that specific locality. In the knowledge of this dissertation it was first Henderson (1974) to question the reasons behind the differences of the city centers in the urban economics literature. However, generally one can

criticize the urban literature due to its insufficiency to explain the cross urban area differences. On another note regional economist also try to approach to regional differences question. While regional economics fill the missing gap in the urban literature and manages to deal with the cross regional differences, there is a tendency among the regional studies to carry out the discussion towards the trade off between regional and national development conflicts (Markusen, 1995 and Dogruel, 2006). Moreover regional economics, unlike the urban economics literature, mostly focus on the results of the location choice of production.

From this standing point urban and regional economics are complementing each other. However, the central question of the dissertation that is the investigation of the location choice of production is tied more strongly to new economics of geography (NEG). The centripetal and centrifugal forces to explain why economic activity tends to locate in specific locations enter the realm of influential studies (Krugman, 1991a, b, c, 1992, 1995, Venables, 1996 and Fujita et al., 2001). The simplicity of the models offered by NEG makes a unique insight for regional scientists as well as geographers. Without making restrictive assumptions to define the geography, one can directly assume working of external economies at the plant level. Here it is worth remarking that the idea of the NEG, Krugman (1991a) in specific, is connected to Marshall (1920). The three pillars of Marshall (1920); labor market pooling, provision of inputs and knowledge diffusion, is later revisited by Krugman (1991a). These building blocks will be important starting points for this dissertation through out the hypothesis construction process.

Originating from the historical discussions of the location theory and combining these with the recent developments in regional science will form the background of the study. However it will also be an important concern to define location choice of production. Three different

indicators that can be preferred are; number of firms, number of new firms, and number of net firms. Over these three indicators this study will focus on the number of new firms. Number of firms will prevent one to decompose the change in the number of new firms and number of firm closers. On the other hand number of net firms will add different questions about the possible reason behind the firm shut down processes. From this point of view it is inevitable to direct the dissertation towards the new firm start up literature. The literature observing the new firm start up behavior is influenced heavily by the developments in the NEG around 1990s. While arguments of Krugman (1991a, b and c) are named and discussed, some more recent entrepreneurial growth models are also visited. In this sense Acs et al. (2005), which follows a Schumpeterian (1912) perspective is an important consideration. The specific role of new firms through the knowledge transfer is underlined. New firms are regarded as a transmission mechanism that transfers accumulated knowledge into economically active (and/or useful) one. This role attributed to new firms can also be felt in Storey (1994) but more specifically in Marshall (1912).

While Acs et al. (2005) is a contemporary discussion, usage of the theoretical insight of the model causes a conceptual problem within the scope of location choice of production. It is already debated by Krugman (1991a) type of NEG models that scale is an important determinant of the agglomeration of economic activity; that can be regarded as the location choice of production. However what Acs et al. (2005) mentions, give a different role to new firms; that is free from the scale of production location choice of production is important due to their capabilities to transfer knowledge even in relatively smaller scales. In the knowledge of the dissertation this is an important missing theoretical gap in the literature. However this study will not deal with this gap, instead will use the theoretical insight of the both views and will aim to combine them on a solid ground.

1.3 Research Hypothesis

After combining the objectives of the dissertation with the theoretical background, this sub section will list the related hypothesis of the dissertation. The hypothesis that will be named here aims to explain why firms in different industries prefer to locate in specific locations. Thus the variation of regional firm formation is going to be explained by using a number of distinct regional social and economical properties of provinces.

First of all as to test the demand pulling hypothesis of Krugman (1991 a, b and c) local tax revenues are used as a proxy for regional income differences. As will be discussed for a number of times within the dissertation, regional gross domestic product (GDP) in Turkey is not supplied after 2001, so it is inevitable to use a proxy for capturing the regional income (and/or demand) levels in Turkey. Here expectation is that regions with high tax revenues will be regarded as high demand areas thus will be suitable areas for firms to locate.

After capturing the impact of demand a number of hypotheses are tested to control for supply side. The impact of labor market as discussed by Marshall (1920) and Krugman (1991a) is investigated. As regional employment data is not sufficient in Turkey, concentration is carried towards the human capital indicators. Two different indicators are preferred. First students enrolled in secondary and university education (relative to population) is investigated with the expectation that high share of students in local population will serve as a future employment pool for new firm start ups, thus pull new firms into those localities. Second education quality indicator that is the number of lecturers per student in secondary and university education is

computed. This quality indicator will control for the regional development level differences; instead of testing the Marshall's (1920) and Krugman's (1991a) expectation this indicator will control for the impact of regional development, that new firms will prefer to locate in more developed provinces of Turkey.

A third important hypothesis is about the impact of local financial development (McKinnon, Shaw, 1973). Per capita deposits and per capita credits are used to account for regional differences in financial capital availability. The expectation is that provinces with deeper financial environments will offer different financial opportunities for new firms. Moreover deep financial markets can also be a sign about the level of economic activity (and/or demand) in different localities. At the end both should be stimulating firm's incentive to locate in financially developed provinces. Here related with financial development a time dummy is also injected as to control for the impact of the 2001 crisis. The expectation is to control for the possible decline in the firm start ups numbers during the crisis year.

As a final item in the supply side, industrial interactions are also investigated (Marshall, 1920, Krugman. 1991a and Venables, 1996). Due to insufficient data for industrial value added and employment a proxy is preferred. Share of new firms start ups in different industries in the total firm formation number is evaluated. The expectation is related with two possible mechanisms; firms can be locating in different industries to complement each other or rather they can continue to locate in same industries which are in favor of specialization of production.

After gathering information about the impact of various demand and supply side effects on the location choice of new firms, the effect of the public side on the new firm formation is

observed. Per capita public expenditures are used as to assess the impact of the public side. The expectation is twofold. One is that increasing public expenditures can be a sign of the approach of the public towards the region, thus increase can be regarded as a future opportunity for new firms. Second public expenditures contain information about the wages paid to public workers, in short will also contain information about the demand side. These two make investigation of the public expenditures important for the location choice of new firms.

After testing these hypotheses a final question will be formed based on the suspected role of geography and spatial interactions. Market access index, which is the distance weighted sum of the tax revenues (as a proxy for local demand), are investigated (Harris, 1954). The expectation is that firms prefer to locate in higher market access areas. This will be shedding light on the possible impacts of the geographical proximity on the location choice of production among the geography of Turkey.

1.4 Data and Methodology

The central objective of the dissertation will be investigated by following a two step procedure. First information about the variation of the new firms will be examined. New firm data contains information about the new firm registration and is obtained from Turkish Statistics Office (TURKSTAT) for the period of 1997-2006 on annual basis for 81 provinces. The data contains information about the 17 sub sectors; this dissertation will focus only on three of them, namely manufacturing, services and trade.

Next after capturing the dispersion of new firm formation, the major reason behind this variation will be discussed by following different methodological insights. Data about the explanatory variables contain information about the local demand, regional supply side and also policy side of the relationship. To control for local demand per capita tax revenues are used from Ministry of Finance (MOF). To evaluate different sources of human capital development as well as education quality enrolment rate and lecturer per student data is obtained from TURKSTAT. Moreover as to understand the local financial development, per capita deposits and credits are computed from the data sources of Turkish Banking Association (TBA). Industrial interactions are tested again by using new firm start up data of TURKSTAT and finally the policy side variable that is the per capita public expenditures are used from the data sources of MOF. All data regarding the explanatory variables are obtained for the period of 1997-2006 at provincial level in Turkey.

The defined data set and the already mentioned research hypothesis will be tested via panel data models. Traditional static panel data models with fixed effect and random effect assumptions will be done (Baltagi, 2005). Moreover recent advances in dynamic panel data literature are also followed and system Generalized Measure of Moment (GMM) are estimated (Bond, 2002). All these preliminary models follow the common assumption that cross sections are independent among each other; the spatial randomness assumption. As an augmentation the spatial interactions in new firm formation is examines by following contemporary techniques of exploratory data analysis (Anselin, 1993a, 1995). Both global spatial autocorrelation measure of Moran (1950), as well as recent contributions of Anselin (1995), Local Indicator of Spatial Autocorrelation (LISA) is preferred. Moreover the investigation of the spatial autocorrelation is also augmented by constructing new models to test the impact of geography on the dispersion of

new firms start ups in Turkey. The recent discussions of NEG that is strongly tied to the market access approach of Harris (1954) will be followed. In this sense such an application will offer a different framework unlike the preliminary panel data models that are estimated with the assumption of spatial randomness and the lack of any specific role attributed to geographical proximity.

1.5 Outline

This dissertation first will review the historical developments realized in the location theory in chapter 2. Starting from von Thünen's (1826) model to more contemporary debates of Krugman (1991a, b, c), different perspectives will all be evaluated. Major building blocks of the process will be highlighted. Through out this discussion, interconnection between regional and urban economics that change shape with the rise of New Economic of Geography (NEG) will also be revisited. After reviewing the central discussions in the location theory, the study will be carried towards the investigation of the new firms' importance for regional development concerns. This will prepare the fundamental insights of the dissertation for constructing an understanding to evaluate the dynamics of the location choice of the economic agents.

After having a general idea about the theoretical foundations of the location theory, the research area of Turkey will be introduced in chapter 3. First the regional economics literature in Turkey will be reviewed with special emphasize on the regional inequalities. The chapter will continue with some findings about the regional inequalities in Turkey. Following this, the link between regional firm formation and the regional income differences will be illustrated.

Subsequent to the introduction of the study area, chapter 4 will construct the research questions and will discuss approaching to these questions from a perspective by neglecting the role of geography and spatial associations. Afterwards the technical consideration regarding the panel data estimation procedures will be done. While introducing static type of panel data models are informative, a deep discussion regarding the estimation procedure of the dynamic panel data models will tried to be done. Final part of the methodological debate will be devoted to the introduction of the basic traditional measures of variation and dispersion.

Afterwards chapter 5 will first show the dispersion of new firm formation in Turkey. Using a number of traditional dispersion measures and illustrating the dispersion with the help of mapping analysis, the distribution of economic activity for three major economic sectors will be classified: manufacturing, services, trade. After having the idea regarding the dispersion of new firm formation, an important objective of the dissertation will be lied down. Investigation of the determinants of the location choice of production will be the remaining analysis of this part of the dissertation. Here it's worth mentioning that, constructed environment of this part, will serve the overall assessment of the study, which will later be combined with the findings of the last (following) chapter of the dissertation.

Final chapter of the dissertation will question the spatial distribution of new firms by looking for the impacts of the spatial associations and the role of geography in understanding the dispersion of economic activity in Turkey. Here through out this chapter, both a methodological discussion about possible ways of approaching the spatial interrelations and questioning the role of geography will be done; moreover major findings regarding the realizations of spatial relationships and the impacts of geographical proximity will be analyzed. From this point of

view, these illustrative and also analytical findings will be summarized at the end by using a final panel data model searching for the place (and/or role) of geography in assessing the location choice of production in Turkey.

At the end all these discussions will be summarized and the major findings regarding the central questions and also a number of complementary questions will be debated in the conclusion part of the dissertation. Other than the findings, a general discussion about the efficiency and accuracy of the preferred alternative approach of regional economics in Turkey will be done as a conclusion.

2. Localization of Economic Activity from a Retrospective Perspective

The question in the mind of economists regarding the distribution of income between economies and also within economies is a traditional one. While the conceptually inequality and economic growth is a significant starting point, recent debates regarding especially the within country inequality give rise to search for different mechanisms behind the process. Firm formation thus the initial location decision of economic activity is observed to be the one of the important factors in explaining the lagging social and economical structures of some regions. Originating from such a fact and revisiting the central argument of the dissertation that evaluates the distribution of economic activity thus localization behavior of agents, this chapter of the dissertation aims to formalize the historical developments in the theoretical background of the location decision of production.

Trying to answer such a broad question needs a careful investigation regarding the definition of economic activity. Moreover to be more specific about what is meant by economic activity border of such an observation should be highlighted. First of all economic activity need not to be a mature one, meaning that observation can concentrate on two different cases; first in favor of new agents and second in favor of already established agents with rising mobility. However the arguments that are constructed throughout the dissertation aims to concentrate on

the first. In short the localization of economic activity is defined by the new agents in the economy in the form of new firm start ups, what one can also call as entrepreneurs. However before entering the discussion regarding the investigation of new firms' literature, the study is aware of the fact that roots of any understanding regarding the distribution of firm start ups behavior should be tied to early findings of historical observations of location theory.

In line with these concerns, this chapter of the dissertation will list the major milestones of localization of economic activity literature. Starting from von Thünen (1826), a path will be lighted up to the post Krugman (1991a,b,c) period, which witness a period that tries to combine or somehow relate different form of economic growth models; core economic growth models, knowledge based growth models, entrepreneurship based economical growth models. Discussions regarding the interaction between urban and regional economics, moreover recent developments in new economic geography (NEG) will be all mentioned. However major emphasize will be given to the debate related with theoretical background of the new firm formation discussion.

2.1 J.H. von Thünen's Isolated State

Understanding the different dynamics for economic activities especially firm location behavior can be understood by originating from the debate between urban economics and regional economics. However it is first von Thünen's idealization that describes a primitive understanding for firm localization in an urban setting. The main question illustrated is related with the land allocation to minimize the combined cost of transportation and production.

Moreover a complementary question is also considered related with the potential competition which in turn will determine the rent differentiation around the central town. This section will give a brief introduction to von Thünen's world by following these discussions.

Before understanding the contribution of the outcomes of the state that von Thünen (1826) constructed, it seems to be a necessity to underline and discuss the central assumptions of the world von Thünen described. The major assumption of the isolated state of von Thünen is the formation of a central town exogenously. This town area serves as the major supplier of manufacturing products and some intermediate products needed by the rural areas. Overall the core postulation here is that, town is the only market. Such a property, meaning the neglected peripheral factors, is the major limitation of von Thünen's idea. A second important assumption is the formation of a concentric ring pattern around the town center as illustrated in figure 2.1. The model demonstrates that the concentric ring pattern is determined by the discussed trade off between the specified costs, which the study deals with shortly. Additionally von Thünen underlined that between the rings and the town there is no canal or river to be used in the transportation; hence all transportation needs are satisfied by horse or wagon. Such a simplification will actually cancel out the need for a decomposition of transportation channels.

The first ring with the less enduring products constitutes the intensive farming and dairy. Second ring contains firewood and timber (forestry); as it is costly to transport to the town wood will also be located close to the town area. Third ring is suitable for bread grain production which seems to be more enduring with respect to the other sorts of agricultural products. The cultivation method of the ring is crop alternation system. The property of this ring is that, all arable land is cropped without having a fallow area. All manure produced by the ring is used on feed crops.

Fourth ring is the improved system of the state. Through out the ring, all land is devoted for either grain or pasture. For each rotation a unique fallow is prepared. Fifth ring is cultivated by using three field farming system which requires one section of the arable land to be left as pasture. Finally in the sixth ring there stands stock farming, with the rest of the area surrounded by wilderness.[1]

The major understanding behind the localization through out the six rings is directly connected to the cultivation intensities of the agricultural product and the trade off between two important costs of production; land cost and transportation cost. The sole property of the product whether the product is enduring or not, is also very important. Especially the products that are expected to fall off quickly will be produced in the first ring which is very close to the town are. Such localization means lower transportation costs but higher land costs, meaning higher rent.[2] Overall the trade off between transportation costs and rental cost determines the firm localization in the isolated state. The model demonstrates that as we move towards the town rent costs and wages start to increase. Moreover we observe a decline in the transportation costs. On the other hand as we move towards the outskirts of the isolated state rents and wages start to decline with increasing transportation costs.

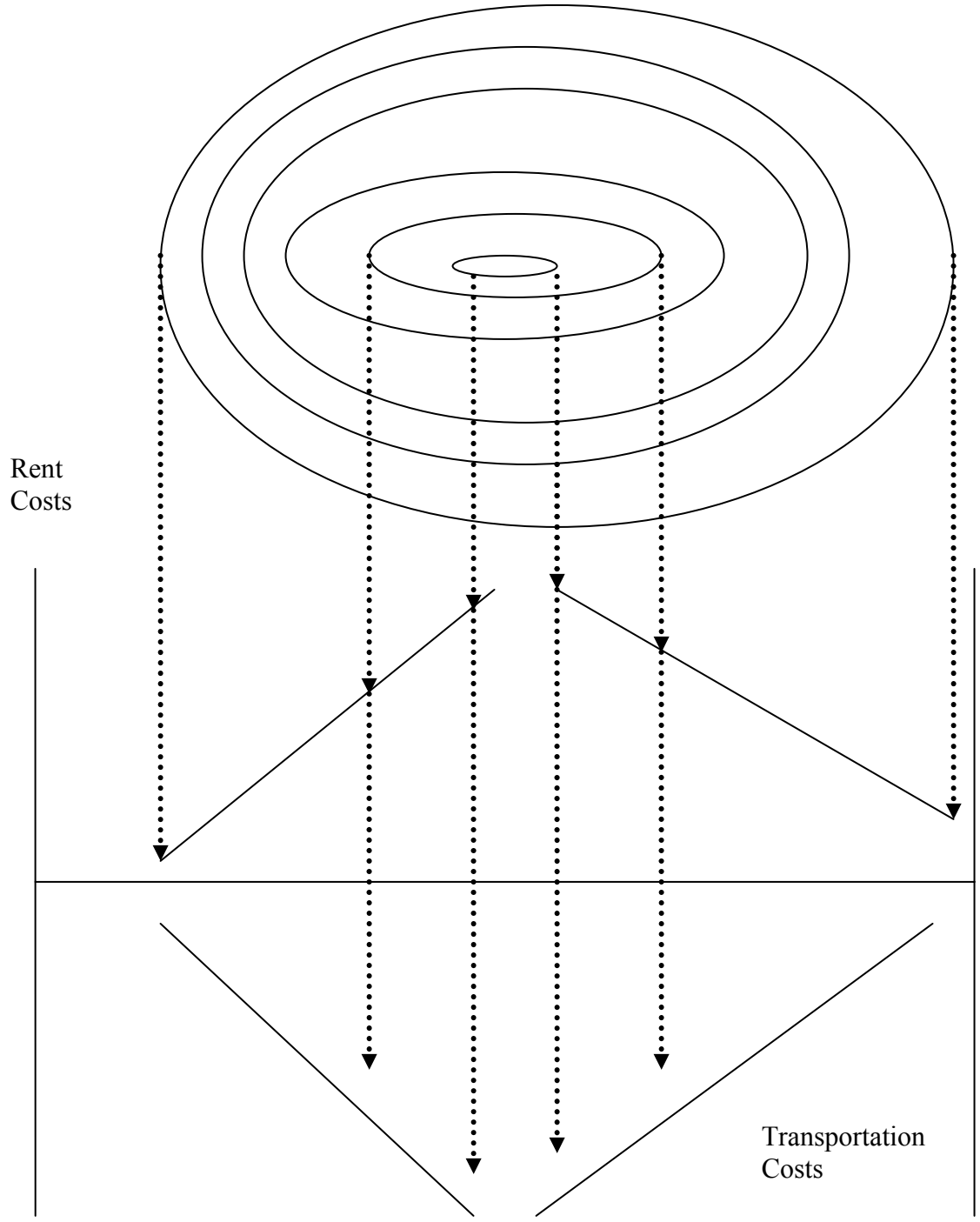
The background of the higher rental costs is associated with the major assumptions of the model. First of all, town area serves as the unique market, meaning that locating in the first ring means being close to the market. Moreover some needs of the farmers in the first ring are

[1] The study will not make a detailed discussion regarding the property of each ring and the methods used in the cultivation. The idea that is intended to be given to the reader is related with the major determinants of farmers' localization question. For details regarding the details of the cultivation methods and different patterns of cultivation through out the rings see von Thünen (1826: 96-105)

[2] von Thünen's concept of rent directly concentrates on the payments associated with the usage of the land. Other fixed costs of production are not included in the rent concept (von Thünen: 18-19)

satisfied by the town area, so locating in the first ring does not only mean locating close to demand, moreover also being close to some of the intermediate needs. The model underlines that for a farmer, to purchase manure from the town is profitable for the first ring. Actually it is the boundary that tells farmer to produce its own manure, that we observe the start of a second ring.

Figure 2.1: von Thünen's Isolated State (a)



Source: von Thünen (1826)
(a)Author's own illustrations based on von Thünen (1826)

As discussed previously another important determinant of localization is the transportation costs. Actually in the von Thünen economy, the premium between the rural area price prevailing at the different rings of the state and the town price is the average transportation cost of the grain. Thus the model remarks that price level in the rural area can not represent the market price. The fact is that rural price level will not contain the transportation cost. In this sense, the concept of transportation costs is important; some may connect transportation costs with the rent concept. As areas with lower transportation costs will be more preferable over distant areas, they will tend to be more expensive in terms of rent. While such an understanding is not wrong, reader has to keep in mind that actually it is the sole of the product and the means of the production that will determine the accurate transportation costs.

In short von Thünen's approach to localization is important. In the scope of this dissertation, the study seems to be one of the first attempts to address a question regarding the spatial distribution of economical activities around an already formed town area. In addition to above discussions the world of von Thünen also has some shortcomings. Among then the fact that von Thünen understanding takes the central town area as a given location is crucial. Questions regarding the choice of the town area's location are not constructed. In short von Thünen type of observations will contribute to the spatial distribution of economic activities around a given demand area, but fails to answer the questions regarding the reason for the formation of the given demand area.

2.2 Marshalian Type Concentration in Localities

After observing the world of von Thünen (1826), a second vital point for the localization discussion is Alfred Marshall's comments on concentration of industries in particular localities. Marshall (1920) in his influential book "Principles of Economics" separately discusses the spatial behavior of specialized industries. Actually it is the remarks of Marshall (1920) that influence Krugman (1991a, b, and c) and his followers. In that sense revisiting and listing the remarks of the constructed perspective is informative.

Before giving full attention to localization hypothesis, it seems to be a necessity to discuss the roots of Marshalian approach from land, as the major factors of production, towards localization. Actually it is an early and important remark by Marshall (1920) that land serves as an important and unique factor of production that determines the right location to other economical activities and agents. This is how land distinguishes itself from other production factors. Similar to von Thünen (1826), Marshall (1920) starts the discussion by observing the place and importance of land in agricultural environments. However the core discussion of Marshalian type of localization uses industrial activities to understand the behavior of economic activity. According to Marshall (1920) for an industry to be regarded as a healthy one, that industry needs to realize three major developments; i) Division of Labor, ii) Development of Specialized Skills, iii) A growing interaction between the different segments of an organization.[3] Fundamentally those items will be the background of the localization understanding of Marshall (1920). Although the starting point of the debate is agricultural production, with the rise of

[3] A deep discussion regarding the marked developments will not be done through out this study. For a brief discussion see Marshall (1920, book IV, chapter IX and X)

machinery and industrial development, one can recognize that heavy reliance is given to industrial development.

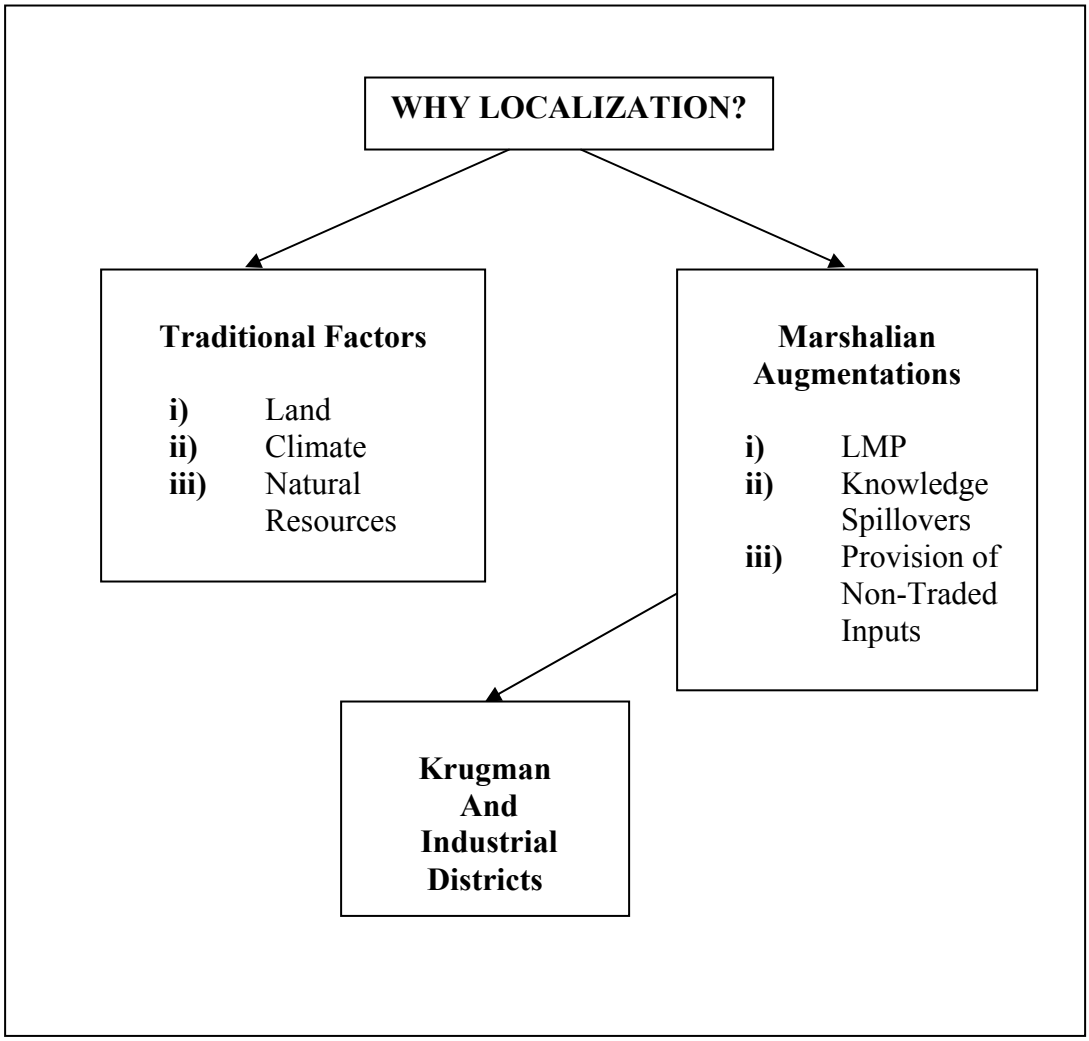
In this context capturing land as a unique object in the production needs a complementary question. “If land is the right concern for agriculture and of course industry, what will determine the choice of land’s location for different economical activities?” It is interesting that Marshall (1920) will not answer this question; instead the core discussion will be on the possible effects of localization of industries. However remarks of Marshalian approach are still important in the sense that, recent debate regarding the spatial distribution of economic activities and the rising interest on clustering of industrial activities can be best understood by reviewing the concerns of Marshall (1920).

First attention is given to primitive economical activities and the closeness of different localities. In a world with high barriers to trade and less opportunities for different forms of transportation, activities will tend to serve the needs of the domestic localities. However as economical systems develop and integration, both within localities and between localities, increases; agents start to gain access to distant places. Such a development will be the background of specialization and formation of industrial districts in the Marshalian framework. Nevertheless such a process will not be straightforward. The constructed model defines different forms of interaction opportunities; unlike the von Thünen’ world that constraints transportation, Marshalian framework allows for different forms of transportation. Moreover lowering trade barriers is also underlined as an important contributor to localization. Actually while these two points seems to be motivators of the process, Marshall (1920) underlines additional benefits and motivators of such a localization process. Here remarks mostly rely on physical factors of

production. Overall these items can be grouped into two distinguished parts. First the traditional factors of production such as land, different forms of natural resources and climate. Second part constitutes a set of interrelated hypotheses; labor market pooling, knowledge spillovers, provision of non traded inputs. Figure 2.2 illustrates the localization benefits and concerns.

Actually first set summarizes a number of traditional motivators for economic agents to choose specific location. Climate and the property of the land seem to be important elements especially for agricultural economic activates. On the other hand being close to natural resources is also important. Two specific examples are formation of metallic industries near mines and formation of iron industry near collieries (Marshall, 1920). The first part of the debate is straight forward; the location choice behavior of agents is connected with a set of traditional factors. But is it still sufficient to take these items as the sole effectors of localization behavior? Marshall (1920) underlines that there will be additional benefits that will serve as significant motivators for location behavior of agents. These items will constitute the second set of items. Following sub sections will shortly summarize the three major hypothesis of Marshall (1920) which is formalized by Krugman (1991a). Moreover especially critiques and additional remarks of Krugman (1991a) will be introduced through out the debate. However note that, a deeper discussion regarding the Krugman's industrial districts is left to the coming sections.

Figure 2.2: Rationality behind Localization in Marshalian Framework (a)



Source: Marshal, 1920
(a) Authors own illustrations and comments based on Marshall (1920) and Krugman (1991a)

2.2.1 Labor Market Pooling Hypothesis

Origin of the Labor Market Pooling (LMP) Hypothesis of Marshall arises from the increasing demand of skilled labor coming from the richer areas. Rich areas demanding higher quality products, directly and also indirectly, starts to realize increasing need for high quality

labor force. Two possibilities arise both at the end causes pooling of a labor force. First expectation can be the movement of a labor force towards the demanding areas, which has to be complemented by the training of the labor force to increase its overall quality. While the beginning of the LMP hypothesis draws such a picture, the evolution of industrial district and start of industrial clusters with their labor market clusters is inevitable. So it will not be misleading to augment the understanding of Marshall's LMP for industrial districts. The postulated hypothesis is interesting and important; such that first of all clustering is observed in the Marshalian framework for industrial districts. Later the augmentation of the model illustrates that industrial district will work both for the interests of employees and employers. In this sense the evolution of an industrial district means increasing demand for a labor force with a given skill level. As such an evolution seems to be a long term movement; labor force can easily re-locate itself as an effective impact. Such a movement will benefit industrial areas; time that will be spent to acquire the required labor force will diminish directly. In addition to benefits to industrial district, for the labor market side, it is evident that a workman with a given skill level in an industrial district will spent less time to find a job, given that that workman has already locate his/herself in the right industry with regards to the skill level.

2.2.2 Knowledge Spillovers

A second remark is the movement and interaction of knowledge. With increasing ideas within a locality, new ideas may evolve and also existing ideas may develop further. The knowledge will spillover in the traditional sense and moreover as industrial districts emerge, this interaction will further accelerate the development of technology. The nearby firms with increasing interaction will tend to benefit from the externalities generated within those localities.

The significance of knowledge spillovers and expected externalities lies in its property of invisibility. This is how Krugman (1991a) and his followers distinguish this item from other inputs of labor and intermediate goods. Such remarks will be later augmented by Krugman (1991a).[4]

2.2.3 Provision of Non-Traded Inputs

Finally the framework also underlines that, some inputs of production that can not be traded and can not be easily acquired by producers, will be produced and supplied by other providers within the same localities. These complementary industries will serve the area and based on the product of the district, they will tend to distinguish from one locality to the other. Marshall (1920) underlines that, such providers will rise around (and also in) industrial districts. These providers will produce these inputs (machineries, parts etc.) at lower costs due to their ability to specialize in the production of those inputs. Actually such an understanding will again benefit both the industrial district and also the input providers.

2.2.4 Possible Extensions to Marshalian Localization

The localization behavior and the realized spatial benefits, up to this point, are illustrated from the view point of the industrial district. While the theme of the study will not aim to concentrate on other side of the economy, one can also look at the picture from the viewpoint of the consumers. A deep observation will not be done in this framework, however it is an inevitable

[4] See sub section 2.2.4 to understand the augmentation of the Marshalian approach. While it is Krugman (1991) to revisit the knowledge spillovers and externalities, it is later the innovation based entrepreneurial activity studies, to combine endogenous growth models and the entrepreneurial behavior.

fact that localization will also tend to benefit the consumers. Clustering of economic activities will also be connected with the purchasing power of the demand area. Result will be the clustering of agents that distinguish between each other with respect to the price of the product that is produced (Marshall, 1920).

Finally a few words can be said for the reverse side of the story, as two major critiques to the Marshalian framework. Interestingly response to these critiques comes from the sole of the approach once more. First major critique is the declining job opportunities for the ones that are not endowed with the required skills of the industrial district. One specific example is the district formed for iron industry, which required at most of the time a labor force with strength. The problem is related with the other member's of the family other than the workman. In such cases while the wage of the workman is high, the average income level of the family will tend to diminish. Marshall's naive response to this problem is the evolution of other complementary industries around the industrial districts, especially in the neighbor areas. A second review is related with the formation of urban areas. Given that formation of a town area will come with specialization in single economic activities, those town areas and the urban life will be prone to numerous risks; such as a decline in the demand for the output of the industry, problems in the supply of the inputs of the industry, etc. Those problems will not only harm the industrial activity but also will indirectly affect the development level of the urban area. The expectation of the Marshalian framework is that, urban areas will be developed enough to contain industrial districts more than one. This is expected to decrease the overall risk of the town area like a portfolio diversification.

2.3 Hoover's Localization of Economic Activity

Both von Thünen (1826) and also Marshall (1920) are vital starting points for understanding the location decision of production as well as benefits arising from such clustering behavior. Discussion regarding these two issues is subject to numerous urban and regional economics' studies, both of which will be discussed in the following section. However before entering this discussion, Hoover's approach will be introduced as to have a broader understanding about the application of von Thünen to modern economic activity based studies. In this sense, observation regarding the localization behavior of economic activity, by Hoover (1963), is an important brick stone of the post Marshalian period. Actually in this perspective, it seems that economic localization understanding of Hoover (1963) is significant as to link the urban economists and new economic geographers, following the seminal studies of Krugman (1991a, b, c). While Hoover (1963) directly does not point out the dynamics behind distribution of production regionally, constructed discussion is vital in the sense that a pure illustration can be captured which in turn will shed light on the concerns of Marshall (1920) that Krugman (1991a, b, c) and other new economic geographers follow.

Two major questions of "what to produce" and "where to produce" are essential debates. In line with the localization discussion, a concentration on the latter questions is necessary. Hoover (1963: 1) underlines that spatial patterns behind firm localization are crucial in the sense that this localization will directly affect the success and failure of economic activity. Following this concern, the distribution of economic activity is observed to be a possible motivation behind the greater equalization or in-equalization of the distribution of industries among different

regions of a nation. Through out this understanding the current section aims to decompose a number of motivations and dynamics behind production localization ranging from cost based towards production based motivations[5].

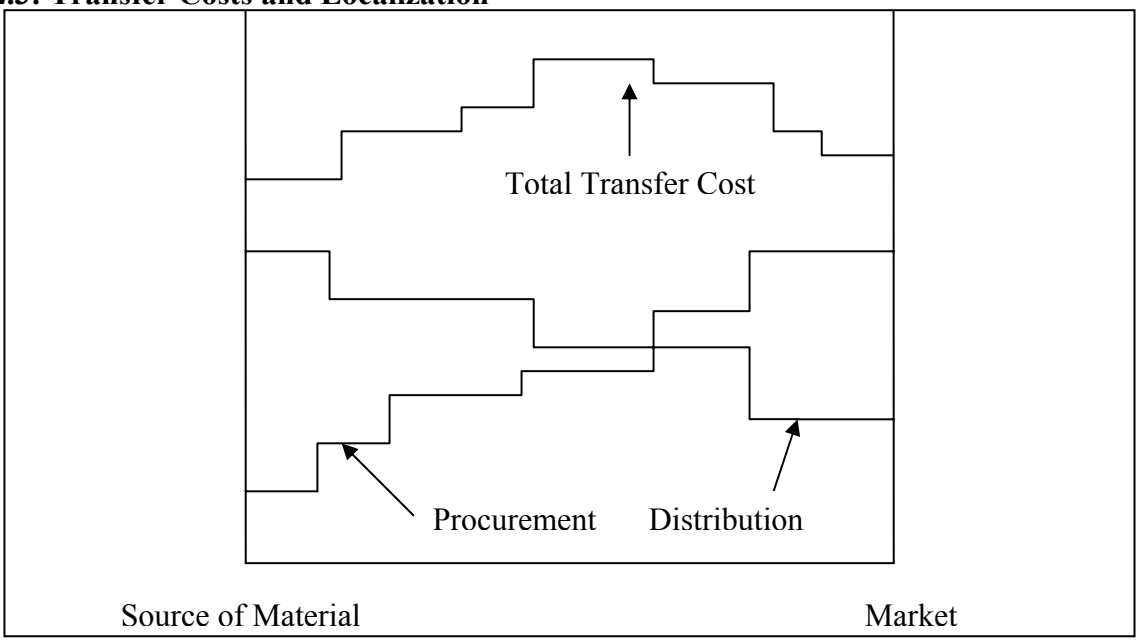
2.3.1 Effects of Transfer Costs on Localization

In this framework the origin of the location choice is related with the transportation or what Hoover called transfer costs. Specifically Hoover (1963: 27) decomposes the transfer costs into procurement costs and distribution costs. In this sense, one can approach the understanding as an augmentation of the von Thünen's (1826) Isolated State. Actually it is the trade off between these two costs that will determine the right location choice for any economic activity. In the simplest case with one good supplied in a single market and the same good using a single input served at a specific area, the right choice of location for a firm is determined with respect to the substitution between discussed costs. As the firm can sell its products in a single market, to minimize the distribution costs it will tend to place closer to the market, however meanwhile as the same firm also wants to minimize the procurement costs regarding the transfer of inputs to the firm, it will tend to move closer to the source of the input. As demonstrated in figure 2.3 there seems to be two ideal locations for production; whether the market or the source of the inputs seems to be the accurate area in this primitive understanding. However based on the discrete

[5] Hoover's description regarding the spatial behavior of economic activity has a two sided view. In the first respect this study concentrates on the static behavior of the question illustrated. In the second part of the study Hoover (1963: 145) introduces the dynamic nature of the question. As the core understating of this section is to give the reader a profound understanding regarding different perspectives towards the localization question, some advance questions of studies are ignored. For details of Hoover's localization, Part two of Hoover (1963) can be reviewed.

curves illustrated, in special cases an intermediate location can even be decided even in this simple framework.[6]

Figure 2.3: Transfer Costs and Localization



Source: Hoover, 1963: 30

In this primitive framework it is still a concern to decide the right location. As rationally the production structure and the sole of the product start to be important. Industrial productions that depend heavily on intermediary goods, which lose value easily thus depends seriously on the distance between the production location and the input sources, will choose to locate closer to the source of the materials. In the extreme case the localization will occur at the center of the source.

[6] Figure 2.3 is a specific case in which there seems to be only two ideal locations. Hoover (1963: 38) remarks that, total cost curve need not to be upward bounded. Actually possibility of a location at an intermediary point is also illustrated; in such cases total transfer cost curve has a minimum between the two extremes. As the core understanding of this sub section is to describe the general environment that is constructed by Hoover, a general picture is illustrated here. See Hoover (1963: 39-40) for a detailed discussion of the issue.

In the economical sense, for the industrial producer, the procurement cost per unit seems to be higher than the distribution cost per unit. On the other hand output of some industrial production has higher distribution cost per unit with respect to its procurement costs. Such industries are discussed under the title of market oriented industries. Here the perishability of the output is very important. In such cases economic activity may easily choose a location closer to final consumption. Advanced models underline that such a separation between procurement and distribution costs give an opportunity to compare two major linkages. While the initial stages of production calls for being close to input sources, the final parts of production may push the production towards market area. In fact Hoover (1963: 47) summarizes that the internal structure of producers, the property of the output and different networks available in the area determines the applicable linkages, what one can call as demand and supply linkages.

2.3.2 Effects of Processing Costs on Localization

While transfer costs represent a significant part of the overall costs of economic activities, second sort of discussion within the framework of Hoover (1963: 67) concentrates on the major costs associated with the factors of production. Following the previous understanding, constructed model assumes major factors of production; land, capital and labor are imperfectly mobile and imperfectly divisible. In such an environment it seems that choice of right location will be determined by the efficient utilization of these factors of production. Combining the previous understanding with the current discussion is not a point of concern here; however

augmentation can later be done as to combine transfer and processing costs and the spatial distribution of economic activity.[7]

The central assumption of the discussion here is crucial. First of all it is evident that cost minimization is a major desire of economic activities. In a framework wherein discussion is relied on the distribution of factors of production, geographic price differentials between these factors should be considered carefully. Actually in case of full mobility of these factors, it is acceptable to expect a decline between the price differentials. Then the required question is related with the mobility of the factors of production under concern. Knowing the immobile production factor of land, discussion can concentrate on labor and capital. Hoover (1963: 69-70) underlines that although land and capital are regarded as mobile factors of production, a deeper understanding can remark the imperfect mobility of these factors too. While labor is free to move towards areas giving the desirable working opportunities, other than the economic factors some social factor can make pressure on the mobility of the labor force. Social and cultural roots can sometimes outperform the job opportunities coming from other districts. A similar understanding can also be constructed for capital. It is evident that capital should be regarded as a less liquid item with respect to labor. In some major cases the sunk costs can not be moved or transferred to other districts which in turn limit the movement capacity of capital base. Hoover (1963: 70) summarizes that originating from this discussion, the expected price differentials will be determined with respect to the mobility of the factors. Shortly as the relevant input combination is affected by the price differentials, mobility of the factors is crucial in the utilization process.

[7] See sub section 2.3.3 for an augmented understanding that aims to improve Hoover's localization.

Although the above mentioned understanding seems to be straightforward, Hoover (1963: 73) underlines two major motivations behind picture. First motivation is that high price level of a production factor is associated with increasing efficiency and increasing need for that factor by economic activity. Limits, ceilings, of the increasing factor price differentiations will determine the intensity of factor usage and the scale of production. Background is evaluated as the capability of price levels to explain the quality of the need for that production factor. The second significant determinant of localization is related with the geographic differentiations in productivity (Hoover, 1963: 76-77). Major emphasis here is devoted to labor. Productivity of labor force is tied to somehow the education levels of the labor force within a district. Actually it seems reasonable to accept that districts with better education levels will represent increasing quality which in turn causes rising price levels for labor as a factor of production. In this framework, up to a certain limit, production will tend to concentrate on labor in the production process. Hoover (1963: 111) mentions that productivity of labor is connected with its distribution geographically. Similar to LMPH of Marshalian framework, motivation is devoted to the declining costs associated with production in case the localization is done by taking into account a pooled labor supply, which is by construction assumed to be experienced thus productive in terms of the interests of the rational employer.

2.3.3 Linking Location Preferences of Economic Activity

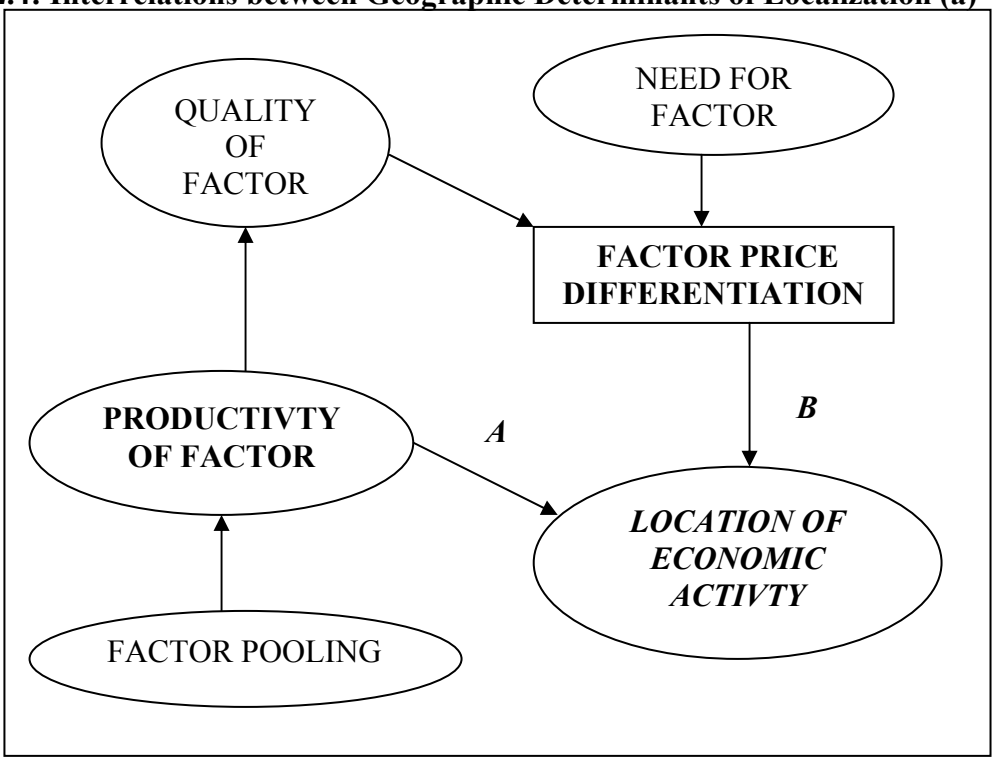
Finally a more general understanding can be constructed following the remarks of Hoover (1963). Figure 2.4 gives a detailed illustration of the possible direct and indirect links for localization of economic activities. It is a fact that Hoover's understanding regarding the localization behavior is heavily influenced by von Thünen's and Marshall's world. However,

Hoover's understanding is crucial in the sense that; different links are constructed towards understanding the spatial distribution of production. Moreover the question regarding the equal or unequal distribution of production is discussed.

The idea behind these networks is two fold. There are two major links affecting the localization; Geographic Price Differentiations (A) and Geographic Productivity Differences (B). As illustrated in figure 2.4 A and B represents two direct channels that are assumed to be influencing the location choice of economic activity directly.

Starting with the price differentials, the model underlines that quality of the factor and the need of that factor, shortly demand of the factor, are the background items affecting the localization indirectly through price differentials. On the other side of the story factor pooling of production seems to be affecting the localization over the productivity item. Moreover it is interesting that a complementary indirect mechanism can be devoted to factor pooling which affects, quality of the factor indirectly. Note that quality of the factor is also an indirect determinant of the localization behavior. Overall the demonstrated figure, which is a summary of Hoover's idea, is crucial, in the sense that, the illustration represents a solid background for connecting urban economists and new economic geographers.

Figure 2.4: Interrelations between Geographic Determinants of Localization (a)



Source: Hoover, 1963
(a) Author's own construction based on Hoover (1963)

2.3.4 Geographic Industrial Patterns and Linkages between Industries

Last remarks that the study intends to deal with is the possibility of industrial interrelation within the framework of Hoover (1963). Such a representation is crucial. While previous debate of Marshalian approach underlines the formation of industries producing intermediate non traded inputs, here Hoover demonstrates that other than intermediate good producing industries, there are possibilities for other interrelation between industries of dissimilar activities.

Location and industrial interrelation has three major roots according to Hoover (1963). First of all similar to previous debate regarding the provision of non traded inputs, framework here remarks that transfer costs play an important role to link intermediate goods' production and the final good production. Industries selling to the market and industries buying from the material source tend to be located in the same localities. Here buyer is the major producer serving to the market, seller is the core intermediate good producer. In such an environment these two groups of firms will tend to locate close to each other, to avoid the possible increase coming from transfer costs.

Secondly, following the same understanding related with the transfer costs, model underlines that there may be economic activities that are necessary for each other. The complementarities of different industrial activities will again act as an attraction for activities to concentrate close to each other.

Finally remarks of Hoover (1963) related with the labor market are vital. Repeating the debate regarding the possible reverse effects of pooled labor as a factor of production, model concentrates on the potential work force who are not equipped with the tools and the knowledge of the pooled area. Such a critique is also discussed for Marshalian LMP hypothesis. Similar to the response of the Marshalian approach, Hoover's model develops its own response. While pooled labor markets benefit the work force for pooling employees with similar identical abilities, there will be other potential workers who are distinct from the majority. It is the start of formation or localization of other industries around and also in the concentrated area. These industries will serve as the major labor demand for the ones that can not be located in the pooled labor market.

2.4 Location Analysis as a Background of Agglomeration Economics and Developments in Regional & Urban Economics

Previous remarks regarding von Thünen (1826) and Marshall (1920) are milestones as to start the discussion about the location decision of production. On another note Hoover (1963) goes beyond these studies and stands as a stand point in the literature dealing with the location decision of economic activity. In this sense previous sections of the chapter are devoted to their explanations in more details. However, while describing and listing these historical developments is vital, listing other approaches of urban and regional science combining and also going beyond von Thünen (1826), Marshall (1920) and Hoover (1963) is a necessity. As underlined by Fujita et al. (2001) both regional and also urban economics have contributions and different approaches to localization phenomenon. However both approaches have their own advantages and disadvantages. As will be summarized shortly, urban economics fails to make an inter urban comparison, instead concentrate on the intra urban developments. On the other hand regional economics, while carries the debate for comparing regions, urban areas and even countries, the core debate is directed towards development concerns. It is the major aim of this section to list the developments in the urban and regional economics literature without entering their roots. By doing so, the background dynamics of the models developed by new economic geographers will be best understood.

Within this understanding while urban economics' approach to localization lags behind regional economics by not explaining the formation of cities and the possible spatial dependencies, assessment of the both approaches is still vital (Nijkamp and Mills 1986 and Fujita

et al., 2001: 25). Actually such an examination is also informative as to clarify the evolution of the discussion of economic activity and business environment, since a clear cut among urban and regional economics can not be constructed for the literature of firm formation thus business formation (Storey, 1994). As will be clarified in the following sections, new firm formation literature mostly prefers to originate from new economic geography. In this respect while von Thünen (1826) and Marshall (1920) are the origins of both urban and regional economics, it is Krugman (1991c, 1992) based agglomeration economies that somehow aim to explain the location decision of production by augmenting the discussion to understand the dynamics of the process. From such a point of view, it is obvious that major distinction between new economic geographers and urban & regional economics literature is the desire of the former to carry out the debate towards concentrating the dynamics of location decision of economic activity without making any strict assumptions regarding the evolution of city centers. Moreover unlike the developmentalist approach of regional studies, new economic geographers also treat development as a determinant of the process not just the result of the route. In this context, as to enter the debate of new economic geographers, a brief review of the urban and regional economics' approach towards location decision is noteworthy.

In fact various studies concentrate on the location decision of production; among them Lösch (1954), Isard (1949 and 1954), Koopmans and Beckmann (1957), Hoover (1963), Alonso (1964), Henderson (1974 and 1987) and Stahl (1987) are influential for the urban economics literature which most of the time concentrates on behavior of households, firms and market. While Nijkamp and Mills (1986) points out Alonso (1964) as the milestone for urban economics, they also underline importance of the pre urban economics period mainly dealing with issues at the urban level. For the pre urban period, Lösch (1954) analyzed the formation of business

locations by observing the clustering of firms, underlining that location decision is mostly motivated by economic factors, not political or natural inequalities (Fujita, Thisse, 2002: 7). While Lösch (1954) is influential for the urban economics literature, especially for Alonso (1964), it fails to provide the relevant information regarding the inner structure of the urban area, unlike the vast literature of the urban economics. Alonso (1964) is a replication of von Thünen (1826), however is influential as to develop the primitive model and offer a more comprehensive understanding to identify the business districts instead of an isolated town. As evaluated later by Nijkamp and Mills (1986), this debate of Lösch (1954) and also Alonso (1964), tries to combine the behavior of households and location of different sets of production in an urban area. On the other hand Isard (1949) in the seminal contribution to the debate revisits the location analysis of the German thought. Isard (1949) connected to the evolutionary approach used in the general location theory of Weber (1909), observes the interaction of markets under perfect competition environment of the general equilibrium models. Locating close to a metropolitan area represents the substitution of rent costs instead of other production costs, what the understanding calls as substitution effect. Moreover Isard (1949) also remarks that it is the sectoral distribution of production factors that matters not the spatial distribution of production, and adds that effective allocation and substitution of the production factors used in the process based on distance is the background of localization of production.

Later Koopmanns and Beckmann (1957) evaluate the indivisible resources on the grounds of location decision of production. The central argument of indivisibilities in human capital and other production factors are observed to be the major criticism towards the general equilibrium models offered by Isard (1949) and others. Major background is the failure of the general equilibrium type of models to explain the indivisibilities and increasing returns to scale

which in turn prevent the models to consider the transportation and land in the spatial distribution of production and economic activity (Fujita and Thisse, 2002: 13). It was later Hoover (1963), focusing on the transportation costs, that formally emphasize that productivity of production factors as well as price differentiations in those factors are ingredient parts of location decision of business units.[8] Hoover (1963) contributes and goes beyond its roots by allowing spatial interaction and describing a formal environment in which both production factors as well as production itself is effective in the location decisions. Actually this is how the region dimension of the study also contributes to the urban literature (Nijkamp and Mills 1986). Following this, while Henderson (1974 and 1987) develops the framework by trying to identify the motive behind the size and functional differences between cities, Stahl (1987) concentrates on the inner part of the urban areas. Henderson (1974) influenced by the isolated state of von Thünen (1826) demonstrates an environment in which a major critique to urban economics can somehow be questioned. Other than the overall understanding regarding the exogenously formed city centers, Henderson (1974) tries to question the background reasons behind the dynamics of the differences of city sizes. The simple understanding demonstrates that each type of city, business area will have an optimal size that yields identical utility levels for each one of them. However the size of the center is affected by type of production; at the end different economic activities will benefit from economies and diseconomies of scale depending on the sole of the production (Fujita et al., 2001: 20-21). On the other hand Stahl (1987) evaluates and lists the major determinants of new firm localization decisions; technical change in production and retailing, or changing population density, increasing incomes and declining transportation costs. Stahl (1987) considers a number of issues such as desires to locate close to demand, fear of locating close to major competitors. Moreover evaluates that increasing returns coming from non-convexities in

[8] A brief overview of Hoover's idea of location decision can be revisited in section 2.3.

technology is vital to understand the location choice of economic activity. The constructed framework postulates conceptual constraints; technological non-convexities, absence of perfect competition, decision of location at plant level, capital commitments of location decision especially for new firms, need for taking into account local labor market and finally place of rents as a determinant of the process instead of as an outcome of the process as described by von Thünen (1826). While Stahl (1987) seems to be far beyond its time in terms of explaining the location decisions, it still continues to follow the major fragile part of urban economics literature and concentrates on intra-urban location patterns without assessing the dynamics behind to construction of the central urban area. Moreover other than the listed negative part of urban studies dealing with location decision of production, one major drawback of the approach is the reliance on households, transportation, public finance, public facilities, urbanization and other side effects of the process to investigate location decisions. Hence it is in the knowledge of the ongoing study that reviewing the contributions of regional economics is a necessity to complement the ongoing debate regarding the location analysis as well as the forthcoming agglomeration economies.

While the above mentioned thought of the urban literature is informative and noteworthy, as revealed previously, it is insufficient to give insight regarding the formation of the central business location and urban area. Moreover the overall impacts of location decisions of economic activity are not evaluated from a developmentalist point of view. Hence possible effects for the external part of the urban areas can not be captured by just reviewing the urban economics literature. Especially debate regarding the trade off between local development and national development can not be handled by just using the urban location problems listed above. While the dynamics observed in the core of the urban area may yield preliminary information

regarding the determinants of location behavior, it seems to be misleading to directly transform an identical understanding for the evolution of the urban area. In addition to that, neglecting the external impacts of the localization processes may cause one to skip the social and economical consequences of agglomeration economics. In the knowledge of the ongoing debate, revisiting the remarks of regional economics is what needed to fill the missing gap of the ongoing discussion. Originating from this discourse one can notably concentrate on regional science and specifically regional economics.

While new economic geographers use the idea of Krugman (1991a, b, and c) as a motive towards the convergence of regional and international trade models, it was well before new economic geographers to identify such a process. Following the previous study of Isard (1949), contributions of Isard (1954) is vital in the sense to connect location and trade theories. Isard (1954), revisiting Isard and Peck (1954) transforms the long run analysis to short run assessment and remarks that distance is an essential variable for both theories. In short it is distance that imitates interregional location analysis and trade theories. Although Fujita et al. (2001) blamed the regional economics to be far away from the construction of Isard (1954), it is at the end a necessity to understand the rise of regional economics and its integration with the trade theory to understand agglomeration economies and economies of geography (Helpman and Krugman, 1985 and Grossman and Helpman, 1991).

Although regional studies concentrate on the development issue, among them there are influential studies that augment the previous models of urban economics. Similar to urban literature regarding the location decision of firms, Beckmann and Thisse (1987) emphasize the location decision of production by remarking that it is the interactions of transportation costs and

also pricing-output decisions of firms that at the end determine the location choice. Background of the questions formed and discussed are connected to five major issues of regional distribution of economic activity; spatial demand and supply, spatial pricing and output, choice of location, spatial resource usage, spatial equilibrium of production. Understanding that is proposed is essential as to construct the place of economics, especially microeconomics, in the regional science discussion. While traditional and natural factors are essential as to understand the behavior of firms and households, a more formal understanding is needed as to give a profound and more economical perspective into the localization phenomenon at the regional base.

Meanwhile, while linking regional and trade theories may propose an understanding in which a more general look at the national base can be observed, still the aspects of the process for the overall economy as a whole can not be captured. To give an insight regarding the social aspects of localization process, the location decision of production should be observed on the grounds of regional development policies. Actually, probable contribution of the regional economics to the ongoing debate is expected to evolve here. While giving a developmentalist view to the study may propose conceptual complexities, it is still useful as to give the reader an idea for understanding the social aspects of agglomeration economies. However note the ongoing section as well as the study as a whole, does not aim to form an environment in which different dimensions of regional development policies can be debated.[9]

[9] See Krugman (1995), Markusen (1995), Baldwin and Martin (2004) and review Doğruel (2006) for a detailed discussion regarding numerous aspects of regional development policies. Also note that once the reader analyzes the recent developments in new economic geography in the following subsections, a more general understanding regarding the connection of these views will be envisaged. However for this point the study will relax and leave the following subsections to determine the different aspects of location decisions and regional inequalities.

Originating from this understanding, discussing the different views towards the regional economics is essential. Fujita et al. (2001) remarks that core-periphery models, base multiplier analysis and market potential analyses are essential elements of regional economic models. In this view theories intended to explain regional economics develop well before 1980s[10]. It was Richardson and Townroe (1986) to summarize the three milestones of regional economics; cumulative causation and core-periphery, radical, neoliberal. Following the regional inequalities, a connection between regional and national issues is tried to be illustrated. Originating from increasing disparities; escalating tension and unavoidable negative developments will prevail which in turn may distort the social and also economic structure of the economy as a whole. Note that approach developed by Richardson and Townroe (1986) has a developmentalist approach with respect to the debate constructed up to now. What the study points out as the reasons of inequalities and disparities enter the agenda of agglomeration and clustering of economic activity. Here to avoid conceptual complexities and also confusion, the study finds vital to point out that, major objective of this section is to summarize the debates regarding the regional distribution of economic activities. However discussion that is carried out by Richardson and Townroe (1986) is also informative and complementary in the sense that, it may help one to discuss the major motives realized in developing economies through their industrialization processes. Such an explanation is also important as a similar debate or concern can not be constructed or observed in the urban economics literature; hence the developmentalist view of regional economics gains insight.

[10] See Doğruel (2006) for a brief review of developments in regional science and policy debate. The review reported in this part of the section, follows the construction of Doğruel (2006: 166-169).

As to clarify the conflict between the regional development and national development concerns, discussion should be diverted towards the overall level of industrialization and moreover overall wealth, development level of nations (Richardson and Townroe, 1986). For an industrial, already developed economy, regional disparities is somehow examined by simultaneous responses of the central authority, to avoid more disparities. Whereas for a developing less industrialized economy, regional imbalances can be accepted in favor of national concerns, especially industrialization. Hence both determinants but also aspects of regional development and agglomeration economies will tend to differ between nations based on their development levels. Richardson and Townroe (1986) emphasized that; this discussed fact is the background behind the differences observed in regional development policies among the globe. Demographic structure and initial conditions of regions in developing and developed economies at the end cause a divergence in the policy objectives and priorities in these set of countries (Richardson and Townroe,1986: 649-650). Such an understanding is later reviewed and discussed by Markusen (1995). Evidence on Brazil, Japan, Republic of Korea and US is evaluated as to understand the connection between regional policies and industrialization struggles in different economies. In this sense rising globalization and integration comes with numerous problems for regional policies. At the end observed pattern is increasing regional disparities in these economies witnessed by increasing high tech industrialization; mostly powered by agglomeration economies. As also summarized by Doğruel (2006) it is the local authorities which are left with the determination of regional issues; however few regions manage to catch the average in favor of a convergence.

While revisiting the developments in urban and regional economics gives an insight regarding the historical developments in the localization question, it seems that the major

contribution of the debate rises in understanding the social and economical aspects of agglomeration economies.[11] However as emphasized previously, after assessing the contributions of Krugman (1991a, b, c) and understanding idea the new economic geography, the distinction between the determinants of location decision of production and outcomes of the process will be better understood.

2.5 New Economic Geography and Krugman's Idea of Localization

Krugman and his understanding regarding the spatial behavior of production is a milestone for localization of economic activity. Krugman (1991a: 1) denoted that economic geography is simply location of production in space. The center periphery model developed by Krugman (1991a), which will be discussed through out the following sub sections relies heavily on the possible channels between international trade, economic geography and regional economics. The background is the need for concentration of analysis at the regional base to capture the whole national and international picture. In short, approaching the localization question from a regional perspective is a prerequisite to understand the specialization of production.

This section represents a solid background of the research hypothesis that will be formed through out the dissertation. Actually as will be reviewed for a few more times, it is the propositions of Marshall (1920) and Krugman (1991a, b, and c) that constructs the origins of the

[11] This section contributes to the chapter and the overall dissertation by listing the selected studies of the urban and regional economics. Listed studies try to discuss the possible dynamics and consequences of location decision of production. For a more detailed representation regarding various aspects of the issues see Njkamps and Mills (1986), Njkamps and Mills (1987), Cheshire and Mills (1999) and Henderson and Thisse (2004).

ongoing study. In this sense through out the section, origins of the new economic geography will be reviewed. The relationship between international trade and localization, the evolution of localization of economic activity with in the framework of new economic geography will be discussed. The section will end with the introduction of the formal two sector model of Krugman (1991a, c). While finalizing the section with the formal model, an augmentation will also be done as to combine the technical considerations of the model with some developmental concerns at the regional level. Note that Krugman's (1991b) empirical findings related with a brief comparison of US and Europe and also the evolution of manufacturing localization will also be demonstrated.

2.5.1 International Trade and Concentration of Production

As mentioned in the previous section, there is increasing attention on the links between trade and location theories. In this context the place of international trade in the localization framework of Krugman is two sided. First of all, following the Samuelson approach, Krugman (1991a) manage to describe the concentration of production within nations based on the free trade environment. While the nation state conceptually differs from regions and urban areas, Krugman (1991a) tries to simplify the model by understanding the possible similarities between factor mobility and free movement of goods. As nation states have political boundaries, Marshalian approach may result with misleading results unlike its success to explain the spatial behavior for urban areas. Following Samuelson, Krugman (1991a: 73-74) remarks that, in case of free movement of goods; free factor mobility will no longer be a must. Actually trade in the goods will create an indirect mechanism that helps an exchange in factors of production, which seems to be forbidden by nature. Such an understanding is the background of possible benefits of localization. The crucial point here is related with the benefits of localization that can be

realized from the free movement of goods in international trade. The expectation here is related with the ability of specialization in producing specific products. As free movement of goods is sustained, countries can specialize and develop its localized industries; exporting the output of those in turn importing the other country's localized industries outputs.

Krugman (1991a) search for the possible working of the indirect mechanism by comparing the processes of United States and Europe. Krugman underlines that European big four – Italy, Germany, France and United Kingdom – are comparable in size with the major regions of United States; Northeast, Midwest, South and West. Krugman remarks that expectations regarding the concentration of economic activity may be quite similar (Krugman, 1991a: 75). Unit of observation is the two digit industries for manufacturing. Krugman introduces an index to account for the specialization capacity of the regions/nations. Given that S_i represents the share of industry "i" in the total manufacturing employment in some region/nation, S_i star represents the other region/nation. The index will be presented in equation 2.1. Increasing index value represents rising concentration. Overall results of Krugman are presented in table 2.1.

[2.1] $$\sum_i \left| S_i - S_i^* \right|$$

Table 2.1: Industrial Specialization Indices (a), (b)

US	NE	MW	S	W
NE	-	0.224	0.247	0.242
MW	-	-	0.336	0.182
S	-	-	-	0.271

EUROPE	France	Germany	Italy	UK
France	-	0.2	0.197	0.083
Germany	-	-	0.175	0.184
Italy	-	-	-	0.184

Source: Krugman (1991a: 77)

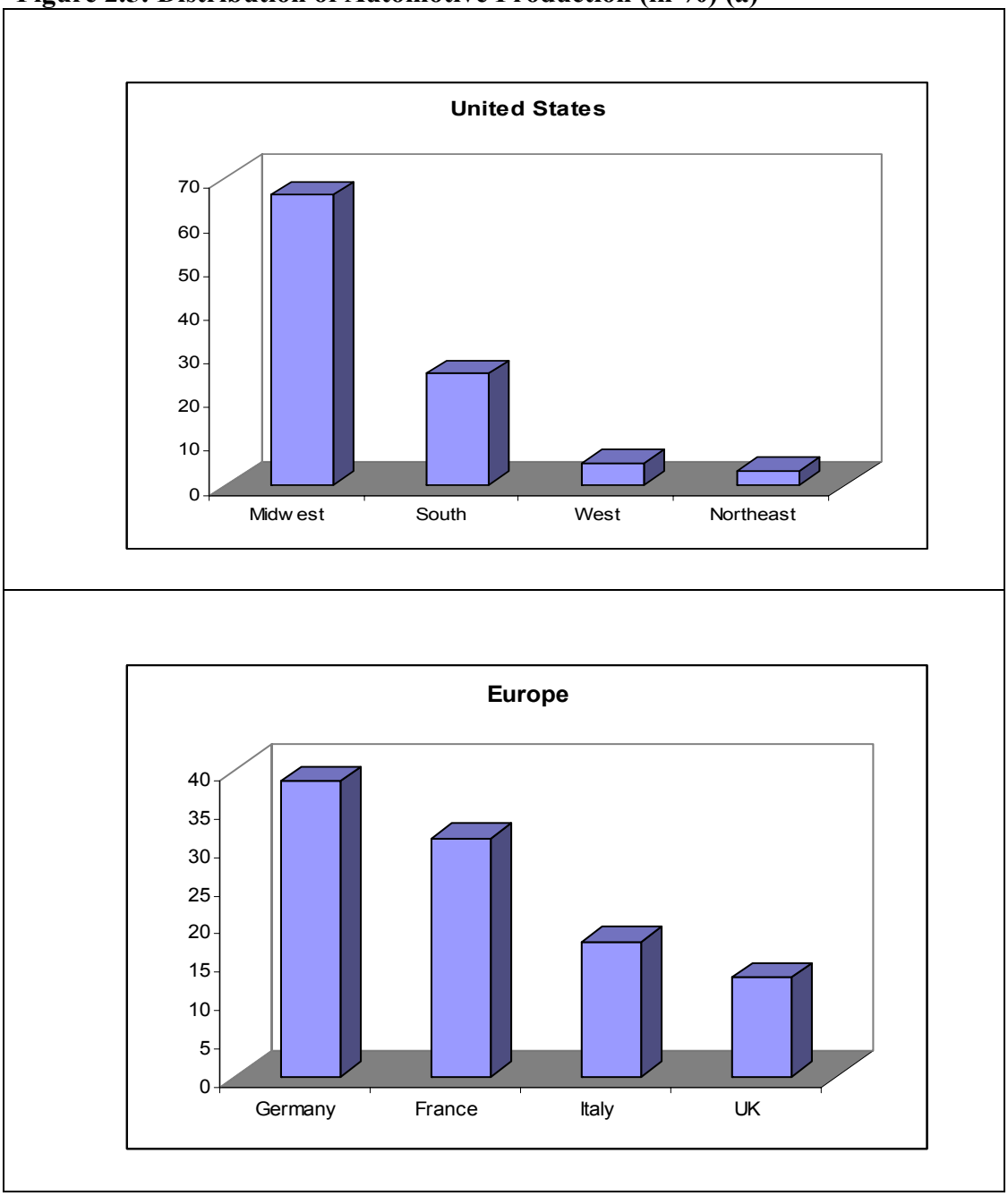
(a) 1977 figures for US regions, 1985 figures for European countries

(b) NE, MW, S, W represents Northeast, Midwest, South and West respectively.

Result indicate that industrial specialization has gone much further in United States compared to the big four countries of Europe. As a complementary analysis, distribution of automotive production in two different observation areas can be compared by observing figure 2.5. Again illustrations underline that production of automotive manufacturing is concentrated in Midwest in United States with a share of 66.3%. It seems that such a concentration represents a divergence of automotive production in United States, whereas the same figure underlines that for Euro area, distribution seems more equal, with clear signs of convergence.

Combinations of the findings of Krugman are crucial. Turning back to the first demonstrated relationship between international trade and economic localization, results underline that United States with fewer barriers to trade and a more homogenous economic activity structure, realizes a higher degree of concentration, while Euro area lags behind, with relative higher barriers to trade. The proposition that increasing international trade will spur the specialization and thus industrial concentration for economies is proved to be accurate.

Figure 2.5: Distribution of Automotive Production (in %) (a)



Source: Krugman (1991a: 78)
(a) Author's calculations and Illustrations based on Krugman (1991a, 78)

On the other side of the framework, more recently Krugman (1998: 21-23) underlines that international trade can also be a cause of decentralization thus can represent the reverse case

for concentration. While the proposition lags behind due to lack of empirical evidence, the background is straightforward. Increasing trade liberalization brings new opportunities for local producers. Both backward and forward linkages may vanish. Exporting to other markets cancel outs the significance of local demand for the producer, meanwhile new opportunities for getting the intermediate goods and other necessities from abroad cause a relaxation of the agglomeration behavior of domestic producers. In short, the demonstrated environment signals decentralization thus a convergence between different regions of an economy.

Overall these two contradicting views of economic concentration based on trade liberalization calls for measuring the trade off between various aspects of the picture. The rise of new economic geography and its modifications has strong connections to new trade theories, thus the remarks of Krugman (1991a) regarding the interrelation between international trade and economic localization are crucial.

2.5.2 Krugman's Idea for Industrial Localization and Districts

Three major reasoning can be demonstrated to understand the place of geography in the economic analysis (Krugman, 1991a: 4). First of all location of economic activity is an important area of study. Secondly there exists a strong connection between international economics and regional economics. Finally economic geography provides an important laboratory to understand the new trade, new growth and business cycle theories.

Although links are vital, the interrelation between economic geography and regional economics is not a heavily discussed area of economic theory. This is where Krugman and his

followers rise and develop more complex models to understand the primitive model of von Thünen (1826) and a more developed urban model of Hoover (1963). Above all it is a fact that Krugman (1991a, 1992) has direct roots with Marshalian approach (1920). The centripetal and centrifugal forces that Krugman (1992) described, is actually what Marshalian approach constructed in 1920. The difference within the framework of Krugman (1991a, 1992) is that, Krugman tries to develop a formal model in which increasing returns and externalities is allowed at the plant level, transportation costs are introduced into the model and finally the competition structure is demonstrated as a deviation from perfect competition.[12]

Krugman (1991b: 484-485) underlines that, the centripetal and centrifugal forces described by the Marshalian approach constitute the sole of the regional disparities in the form of divergence and convergence. Actually it is the introduction of agglomeration or divergence of industrial localization as an augmentation of the Marshall's understanding. Krugman (1991a) before developing the two sector model, briefly reviewed the Marshalian approach and try to explain with agglomeration of industrial activities. (i) The market size that can create both backward and forward linkages is crucial. While being close to market has a potential benefit by locating close to demand thus backward linkages, an additional benefit also prevails in the form of being close to intermediate good suppliers thus forward linkages. Krugman's remarks are significant. As production is the dynamic behind income generation thus demand creating, there should be a circular causation. However instead of explaining the causality here, Krugman moves to a set of complementary arguments to explain that there are other sources and benefits of industrial localization. (ii) A second crucial aspect is the labor market hypothesis of Marshall (1920). Krugman realizes that the thick labor market will save the workers' time by spending less

[12] See 2.5.3 for details of the two sector model.

time to get a job; at the same time will cause a cost cut for the producers in the form of reduction in the hiring process. (iii) And finally the externalities realized in the form of knowledge and technology spillover is another aspect of the localization process. However Krugman (1991a) finds it very interesting, that the localization process of the early industrialization period constitutes of economic units that lag behind technological advances.

Above all after capturing the major items working on behalf of industrial localization and concentration, Krugman (1991c) discussed that it is the existence of three major facts that actually sustain the applicability of the industrial concentration view. In this sense according to Krugman (1991a, b, c) increasing returns, transportation costs and scale economies stand at the center of the debate. While the existence of increasing returns and external economies at the plant level cause numerous advantages for economic units to choose to locate in a single (or few) locations, the fact of transportation costs is the stimuli for units choose being close to demand and supplier areas (Krugman, 1991c, 1998).[13]

Originating from this general discussion, Krugman (1991b) tries to understand the localization behavior of manufacturing industry in US and asks specific questions regarding the previous remarks of the literature. Findings for US are interesting in the sense that, historical developments seem to be very effective in determining the behavior of localization. Overall the manufacturing belt developed in US is neither connected to demand nor to the suppliers of intermediate goods or natural resources. Instead, the externalities realized in the belt seem to be the dominating factor. Overall explanation of the developments underlines the changing structure of manufacturing production historically. Early period of US, is dominated by agricultural

[13] Details of the assumptions will be discussed in the two sector model.

production. Meanwhile manufacturing production is characterized by few economies of scale and transportation costs were high, resulting with weak industrial concentration. As time passes, with the industrial transition, manufacturing economies of scale increases. With declining transportation costs and rising share of population outside agricultural production brings opportunities for concentration in specific parts. It is interesting that once the belt is formed in the south part of the country, further developments in other parts of US, ie. West, do not alter the production. The already formed districts and the attraction of the existing manufacturing units underline the dominance of the externalities in US instead of the discussed factors of demand and intermediate goods supplies. In deed although Krugman (1991b) does not concentrate on directly demand potential as a pull effect, he is aware of the possible circular causality that may emerge between manufacturing production and also demand potential of the localities. Finally Krugman's (1991) own critique to this general understanding is the lack of explanation regarding the distribution of different manufacturing industries in different regions.

2.5.3 Two Sector Model and Localization of Economic Activity of Krugman

The origins of the model that will be introduced here aims to explain the sources of location decision of production in terms of centripetal and centrifugal forces. Krugman (1992, 1995, 1998) explains that market size, thick labor market and pure external economies acts as the centripetal forces whereas immobile factors of production, land rent, pure external diseconomies are the centrifugal forces of localization. In this sense external economies has an important place in the understanding constructed here. Actually Krugman's (1991c, 1992, 1995) understanding about that the background of the location decision of production originates from Henderson (1974) and Fujita (1988) in terms of the idea regarding the external economies. Henderson (1974)

just assumes localized external economies without explaining them and evaluates the size and number of cities, whereas Fujita (1988) explains external economies as originating from the increasing returns in a monopolistically competitive market producing non-tradable inputs (Krugman 1992, 1995). In fact the major distinction of Krugman's (1991c, 1992) two sector model lies in the behavior towards explanation of external economies. In such an understanding Krugman (1991c, 1992) explains that externalities are pecuniary externalities that can be understood at the firm level with the interaction of increasing returns, transportation costs and mobility of production factors, which are both vital elements to understand the agglomeration behavior of economic activity. In this sense actions of economic activity for deciding where to locate mainly affected by minimization of transportation costs, locating close to market (backward and forward linkages) and mobility of factors of production. Krugman (1995) revisits his understanding and explains that not all factors of production are mobile, however as an immobile factor of production he prefers not to use land use, thus rents. In fact only disagglomeration factor in this setting is the agricultural production locating in the hinterland (Krugman, 1995).

While origins of the two sector model can be related with Henderson (1974) and Fujita (1988), Krugman (1991c, 1992, 1995) also remarks three valuable approaches of the urban literature. In this context Harris (1954) is vital as to explain the market potential (access) discussion by proposing that economic activity will tend to locate as a positive function of other potential demand areas and a negative function of distance.[14] A second approach that Krugman (1992, 1995) also considers is the cumulative causation as suggested by Pred (1966) and Myrdal

[14] A more detailed explanation of the market potential (access) approach of Harris (1954) will be done in chapter 6, as to explain the geographic impacts of income potential on the distribution of economic activity.

(1957) that initial conditions and also accidents of the history matters to understand the pattern of location. Finally Christaller (1933) and Lösch (1954) type of examination of central place theory also enters the agenda of Krugman (1992, 1995); that there is a trade off between economies of scale and transportation costs.

Originating from these debates, Krugman (1991c, 1992, and 1995) formulates his own model. Krugman's model that will be discussed through out this sub section relies on the following major tricks of new economic geographers. (I) Dixit Stiglitz type market structure, (II) Transportation costs in the form of Iceberg, (III) Dynamics of Localization, Evolution, (IV) Simulations thus computer usage.[15]

(I) Dixit-Stiglitz type of competition is a crucial assumption of the new economic geographers. Dixit and Stiglitz (1977) use a monopolistic competition model which is a suitable one for economic geography.

(II) Iceberg type of transportation costs assumes that some amount of the goods shipped losses value before arriving to its final destination. In the framework of regional analysis, models assume continuous loss in the value of the good shipped.

(III) Evolution is the dynamic process behind the process described by Krugman (1991c). Production factors will tend to locate in areas giving higher returns, thus changing price for factors of production will affect the localization of production.

[15] For details see Krugman (1991c, 1992)

(IV) Computer is a major tool in the simulation process that helps individual examiners to understand propositions and hypothesis over numerous simulation based observations.

Following this framework, the model that Krugman (1991c, 1992, 1995) constructed assumes that there exists two sectors; agriculture with constant returns to scale production and manufacturing with increasing returns to scale in production. Agricultural production is connected to the immobile factor of production, land, whereas manufacturing can be located in both regions. Individuals in this environment will have the following utility function in the form of a Cobb-Douglas one. μ represents the share of manufacturing in overall expenditures. C_i represents the manufacturing (M) or agricultural consumption (A).

[2.2] $$U = C_M^{\mu} C_A^{\mu-1}$$

Under the given conditions while there is unique homogenous agricultural product, manufacturing aggregate will be determined by a large set of varieties, with constant elasticity of substitution σ (>1) between any varieties. N represents the number of varieties.

[2.3] $$C_M = \left[\sum_i^N c_i^{\frac{\sigma-1}{\sigma}} \right]^{\sigma/\sigma-1}$$

In this construction as later we will augment, μ and σ are the two major parameters that determine the equilibrium (Krugman, 1991a: 488). The two sector and two region model underlines that there are two major factors of production affecting the equilibrium; workers and farmers.[16] Farmers are tied to land and represent the immobile factor of production of the model. Under these circumstances, farmers will supply (1-μ)/2 in each region. On the other hand workers are the mobile factor of production can be located in both regions. Given that workers in regions 1 and 2 are presented by L_j total number of workers will ad up to $L_1 + L_2$, equal to μ. This ensures that wage levels for agriculture and manufacture activities will tend to be equal in equilibrium.

As noted before agricultural production is made under constant returns to scale. Thus farm labor used in the production can be set equal to the agricultural output for each region. On the other side of the model; manufacturing production realizes increasing returns to scale and has the following cost structure; a fixed cost and a constant marginal cost; where j represents the region and i represents the manufacturing good. Note that L_A and L_M are the nation wide agriculture and manufacturing labor force respectively. They are fixed by nature and allocated across region

[2.4] $$L_{Aj} = Q_{Aj}$$

[16] Krugman in 1998 paper underlines that the concern can be the factors of production land and capital as the mobile ones and land as the immobile one. However such an understanding will bring a number of complications. The substitution between land and labor will be the major complication of the model. That's why Krugman stick with the assumption of two factors; mobile workers and immobile farmers.

[2.5] $$L_{Mij} = \alpha + \beta Q_{Mij}$$

Another crucial aspect of the model is the assumption of transportation costs; while transportation of agricultural products is assumed to be costless, the transportation cost is in the form of a melting iceberg for manufacturing goods. This costless agricultural transportation assumption provides an insight for the equalization of the price of agricultural output in two regions, thus equal earnings for farmers in each region. However for manufacturing goods model remarks that only a fraction (v) of the manufacturing good shipped arrives to its destination. τ represents the transportation costs, D represents the distance between region 1 and 2. τ is the final parameter of the equilibrium in the Krugman's framework. Overall fraction will be given as follows;

[2.6] $$v = e^{-\tau D_{12}}$$

As indicated before farmers represent the immobile factor of production, however workers are in the desire of moving to region that offers higher real wages (Krugman, 1992: 14, 1995: 96). In this setting average real wages are indentified as in equation 2.7, where $\bar{\omega}$ represents the average real wage, λ is the share of manufacturing workers in a given region and ω_j is the wage that a worker in region j receives. Under these conditions Krugman (1992, 1995) remarks that any point in time workers will move away from regions offering a wage rate lower

than the average. Note that equations 2.8 to 2.15 will broaden the discussion regarding the distinction between short term and long term dynamics.

[2.7] $$\bar{\omega} = \sum_j \lambda_j \omega_j$$

Given the three important parameters of the model - μ, σ, τ - short run equilibrium can be described based on the profit maximizing behavior of individual firms in both regions under Dixit-Stiglitz (1977) type of monopolistic competition. Setting price of manufacturing good in region 1 equal to a fixed mark up over marginal cost and replicating the same understanding for the other region, the model obtains the following two representations;

[2.8] $$P_1 = \left(\frac{\sigma}{\sigma - 1} \right) \beta w_1$$

[2.9] $$\frac{P_1}{P_2} = \frac{w_1}{w_2}$$

Using the manufacturing output equation 2.5 and the price equation 2.8, one may determine the zero profit condition and underline that output of manufacturing production in each region is free from the wage rates, demand and other kind of dynamics (Krugman, 1991c, 1992, 1995). Per firm output will be the same in each region. Such an understanding provides a simplification that manufacturing good produced in each region will be proportional to its manufacturing labor force because all varieties of manufacturing goods are produced at the same scale (Krugman, 1992: 17). Krugman (1992:17-18) also remarks that equation 2.11 is the quantization of production that helps explaining increasing returns in the model.

[2.10] $$Q_{M1} = Q_{M2} = \frac{\alpha}{\beta}(\sigma - 1)$$

[2.11] $$\frac{n_1}{n_2} = \frac{L_1}{L_2}$$

After evaluating the steps of the Krugman's two sector model up to this point, next emphasize should be given to the evaluation of the pull and push effects, thus dynamics of the model. Actually here one important point is regarding the understanding that Krugman constructs though out his influential studies. While Krugman (1991a) concentrates on the explanation regarding the full clustering of manufacturing in one region and questioning its sustainably, Krugman (1992) and Krugman (1995) try to evaluate the centripetal and centrifugal forces

originating from the market access or what one also may discuss as the purchasing power approach of Harris (1954). At the same time Krugman (1991c) tries to capture the major motivations by using a simple framework in which the three major parameters are used as to see the convergence and divergence of production. While overall all approaches remark the same motivations, to be connected to the central idea and also to avoid conceptual complexities, the remaining part of the discussion here will be tied to Krugman (1991c).

In this sense after observing that manufacturing goods produced will be proportional to manufacturing labor force in each region, the debate is carried towards the comparison of the short run and long run equilibriums. Starting with the short run dynamics Krugman (1991c) suggests that consumption in region one can be decomposed based on the domestic and foreign consumption. Here the vital element is the distinction between domestic price level, which is free on board by nature - P_1 -, whereas other region's price level should include the transportation costs - P_2 / τ -. Krugman (1991c) by using these information to compute the relative demand realized in region one ($c_{11} \big/ c_{12}$), regarding domestic and foreign demand, next computes the ratio of region 1 expenditures on domestic manufacturing goods to the other region's goods. This relation is summarized in equation 2.12.

[2.12] $$z_{11} = (\frac{n_1}{n_2})(\frac{P_1}{P_2 \tau^{-1}})(\frac{c_{11}}{c_{12}})$$

Originating from this relationship income level of region 1 workers are illustrated as in equation 2.13. Here by symmetric property of the overall model, similar computation can also be carried out for the other region, which will end up with a similar figure.

$$[2.13] \quad w_1 L_1 = \mu\left[\left(\frac{z_{11}}{1+z_{11}}\right)Y_1 + \left(\frac{z_{12}}{1+z_{12}}\right)Y_2\right]$$

Given these circumstances income level (Y) in two regions will be the aggregation of the agricultural income and the manufacturing income. Assuming the equal distribution of agricultural farmers between two regions, the region wide income level will be determined as follows (where j represents regions 1 and 2 respectively.)

$$[2.14] \quad Y_j = \frac{1-\mu}{2} + w_j L_j$$

Remembering that manufacturing production share in a region will be proportional to the workers share in the region, understanding the behavior of the movement of labor in manufacturing is vital as a short run analysis. Here the crucial question is that; for a given shift of workers from one region to the other, how will the wage rate react? Two opposing views are underlined by Krugman (1991 a: 491). Firstly, for a given shift of workers from one region to the other, wage rate may increase because of the home market effect; meaning that increasing

workers proportion will mean increasing manufacturing production thus rising demand. On the other hand, in the smaller market workers will face less competition. Here remarks of Krugman (1991c) highlighten the trade off between lack of competition in the local market and being close to larger markets.

However these short run dynamics should be augmented. As denoted by the model, in the long run the significant point is not the nominal wages, but the real wages. Within this framework the relationship between population level and the price level gains importance. The real wage that workers earn in each region will be presented in equation 2.15.

[2.15] $\omega_j = w_j P_j^{-\mu}$

From equation 2.15 it is apparent that in case wage rate in both regions are equal; a shift from region 1 to the other will lower the price index in the region one and has the reverse effect on the other. This in turn will raise the real wages in the first region and lower in the second one. A complementary question can be formed here regarding the behavior of the real wage rate for a given shift in the workers proportion in the regions. Here the answer depends on the level of transportation costs. High transportation costs will affect the relative wage rate negatively resulting in regional convergence.[17]

[17] See equation 2.13 to discuss the full impacts of the parameters.

Overall Krugman (1991c: 492-493) underlines the following sources of regional convergence or divergence;

> *"As we have seen, there are two forces working toward divergence-the home market effect and the price index effect- and one working towards convergence, the degree of competition for the local peasant market. The question is which one dominates."* Krugman (1991c: 492-493)

In thus setting Krugman tries to identify the centripetal and centrifugal as to account for regional divergence or what Krugman also called agglomeration – concentration - forces by originating from the formal two sector model by imposing a number of conditions to the three already mentioned parameters of the model - μ, σ, τ – (Krugman, 1991c: 494-496, 1992: 21-27, 1998: 27).

Large share of manufacturing in the economy is an important pull effect for production. This centrifugal force has two explanations. First of all forward linkages will prevail as manufacturing firms are suppliers for manufacturing workers. Second of all manufacturing industry will represent the demand potential and high income of the region explaining the possible backward linkages. Overall this remark of Krugman (1991c, 1992) is the major motivation of the various studies discussing the sources of location decision of production.

Economies of scale at the level of the firm, is also vital. The ratio of $\sigma/(1-\sigma)$ is actually the ratio of price to marginal cost, measuring the equilibrium economies of scale. σ which represent the elasticity of substitution is inversely related with the equilibrium degree of economies of scale. In short high elasticity of substation works against agglomeration.

Low transportation cost between regions works on behalf of concentration of production, thus agglomeration. Meaning that, rising transportation costs makes it costly to concentrate production in single or few locations.

While theoretical background of the model introduced here is just the major brick stones, it still helps observers to have a profound understanding regarding the behavior of economic activity through out the localization process. Overall one may combine the Krugman's (1991c, 1992, 1995, 1998) localization with the Marshalian approach. In this framework both demand and supply side of the relation is crucial. On the demand side of the relationship, localization of economic activity is heavily affected by the overall income level. Similarly the supply side of the relationship underlines that formation of the intermediate good producers is also essential. Transportation opportunities also enter the Krugman's framework affecting both demand side and the supply of the relationship.[18]

2.6 New Firms and Impacts on Regional Economic Growth

Debate constructed up to this section deals with the understanding the major building blocks of the location theory. However to evaluate the measurement and observation of location decision of production, one needs to have a clear understanding regarding the right indicator to be used in the location decision of production. As emphasized at the beginning of the chapter, number of firms may be a proper indicator to examine the location decision of production; however as to have a dynamic understanding regarding the location decision of production using

[18] Note that extensions of the model, especially the dynamic equilibrium, are not revisited here to avoid complexity. See Krugman (1992, 1995) for reviewing the dynamic equilibrium and possible extensions.

new firms as an indicator to asses the location decision of production seems more prominent. In this sense, this section will clearly underline the new firms as the indicator of location decision and next will concentrate on the necessities to examine the new firms' behavior in the context of regional development. Hence it is the core objective of this section to give a clear insight about the major reasons of examining location decision of new firms.

While numerous factors are effective in determining the right location for production, the outcome of the process is also vital as to understand the need for studying behavior of localization of economic activities. Three different views will be evaluated and concentration of the ongoing study will be illustrated. First the view of industrial economists and next the approach of macro and micro aspects of regional economics will be constructed. While these two views can be regarded as traditional and early developments in the new firm formation discussion, the last one needs a broader examination. In this sense, the core construction of the ongoing study will be opened which is directly linked with a more contemporary approach that is the entrepreneurship based economic growth.

2.6.1 Early Developments in the New Firms Literature

Originating from this classification, Orr (1974) is a crucial starting point. Orr (1974) describes and tests the major arguments of the industrial economists. The determinants of entry and the obstacles against entry are tested for Canadian manufacturing industries. Orr (1974) mentioned that capital requirements, intensity of advertising and high industrial concentration are significant and vital barriers for entry. Research and development intensity and risk level measured by the standard deviation of the past industrial profits are observed to be modest

barriers to entry. Meanwhile size of the industry is a positive determinant of entry. Finally past profit level and past industry growth are positive but weak determinants of entry. In this sense Orr (1974) is an important building block in the industrial economists' perspective regarding firm birth. However it is later Geroski (1991) to define a more detailed approach and illustrate the major determinants of firm formation from the perspective of industrial economists. Geroski (1991) defined a number of measures that explains the decision of new firm formation such as; net entry rate, gross market penetration, post-entry growth rates, and entry hazard rates. The essentials of the framework rely on the profit maximization behavior of business units; thus the attractiveness of industries and also regions coming from post profit levels. While such a broad understanding is found to be informative the study gives higher importance to possible barriers to entry; and defines indirect mechanisms that affect firm formation. Within this context three major issues are highlighted; (i) Economics of scale in production, (ii) Absolute Cost Advantages, (iii) Product Differentiations. Economics of scale is identified as one of the major obstacles for new firm formation through the increasing role of accelerating capital requirements. Absolute cost advantage arises, coming from the probable difference between incumbent and new entrants most of the time working on behalf of the incumbent firms. Here study underlines the advertising and R&D intensities of the process that underlines a major entry barrier for new firms through their struggle to differentiate their products.

The second approach, which was mentioned previously, is a combination of macroeconomic and microeconomic view towards understanding the factors affecting new firm formation. Actually it was Storey (1994) to first describe a formal environment to understand the significance of small business sector in regional economics context, what later described as the new firm start ups. Storey (1994) gives special emphasis on small firms and new firm start ups.

The background reason of studying small firms is first related with the employment creation potentials of the small firm sector. Moreover the innovative capabilities of small firms are also a crucial aspect of the understanding. Other than these traditional and discussed figures, the different behavior of small firms as responses to public and urban policies is underlined. It is discussed that impacts of the debated polices on the small firm sector may deviate from the expectations. Originating from this preliminary consultation, Storey (1994) gives a concentration on the formation of new firms and the death of new firms. The reasoning is two fold;

> *"Yet if we are interested in birth of firms, these firms by definition are new, and also very small and likely to have a short life-span"* (Storey, 1994: 50)
>
> *"The fundamental characteristic, other than size per se, which distinguishes small firms from large, is their higher probability of ceasing to trade."* (Storey, 1994: 78)

Storey (1994) underlines that; the debate over birth of firms, representing the evolution of new firms should be accounted for carefully. A major reasoning of the process is related with the observed variations in firm birth rates; both between different industries and also between different regions. Storey (1994), following Knight (1921), remarks that individuals face three different choices in labor markets; (i) Unemployment, (ii) Paid Employment, (iii) Self-Employment. This approach is regarded as the labor market approach and assumes that it is the behavior of individuals not the firms to form new enterprises. Taking into account the behavior of individuals Storey (1994) and Knight (1921) diverts their discussion towards the fact that the number of new firms is crucial, so it is a necessity to understand the factors that affect the process. According the Storey (1994), this representation is the major distinction between Geroski (1991) and labor market approach and also his own view;

> *"Industrial economists are asking, 'Into which sectors, and under which circumstances, will entry take place?'. The industrial economists are therefore not interested in the total number of entrants in the economy as a whole, but only in their sectoral distribution and the impact which that entry has upon prices. A supply of entrants is assumed to be given. Other groups, including labor market economists, are interested in the total number of new firms. In this sense the supply of entrepreneurs and the factors which influence this are of central importance."* (Storey, 1994: 62)

Originating from this understanding Storey (1994) by discussing numerous micro and macro economic factors that may affect the firm formation process and the variation of the regional firm birth in different economies, becomes a major influence to the growing empirical literature of 1990s. For the macroeconomic factors demand side, supply side and policy side variables are determined. Overall an environment is illustrated in which different factors can be explained as the background of the variation of the regional firm formation. As demand side variables; population, in-migration, population density, level and change of unemployment, wealth and GDP growth, as supply side variables; qualifications of managers, firm size and specialization, house and land prices and finally for policy side; socialist voters and local government expenditures are used. For the microeconomic side of the relationship, factors affecting self employment decisions of the labor force are listed; martial status, education level, family structure, employment status, age, ethnic origin, sex, social class. Within this context Storey (1994) finally concentrates on the policy implications toward small firms and new firm formation. Special emphasis is given to employment policies, public policy and financing of the new business start ups.

For the employment policies, specific role of firm births and deaths on the net job change is illustrated (Storey, 1994: 162). However findings underline that the positive effect of small

firms is sometimes overemphasized and side effects of the process especially declining quality of created jobs is neglected. Keeping in mind these arguments Storey (1994) continues to favor the role attributed to new firms in the job creation process.

Furthermore Storey (1994) argued that traditional factors of; asymmetric information, agency issues, risk in lending to small firms, monitoring costs, competition in banking sector are the major constraints of small firms thus new start ups. The listed problems and the nature of new start ups, their uncertainties clarify the need for a supporting mechanism from public or private side of the economy.

From this perspective Storey (1994) for the public policy side, underlines the possible assistance programs and the probable impact of the public policy over expenditures on the small firm sector; that by construction contains the new firm start ups.

2.6.2 Rise of Knowledge Based Economic Geography Models and New Firms

While Geroski (1991) and Storey (1994) in their formal frameworks explain why new firm formation and its regional distribution is important, understanding the phenomenon in a more growth oriented view will be more influential. Actually the third approach is the entrepreneurship based growth theorists who try to link Romerian Type economic growth and Krugman Style economic geography models. Consecutively Romer (1986, 1990) are milestones endogenous growth literature. Place of human capital is constructed as to explain the major motivation of economic growth, what the economists direct as technological development. The hearth of the Romerian framework relies on three building blocks;

> *"Technological change provides the incentive for continued capital accumulation and together capital accumulation and technological change account for much of the increase in output per hour worked"* (Romer, 1990: 72)
>
> *"…market incentives nonetheless play an essential role in the process whereby new knowledge is translated into goods with practical value. Our initial understanding of electromagnetism arose from research conducted in academic institutions, but the magnetic tape and home videocassette recorders resulted from attempts by private firms to earn profit"* (Romer, 1990: 72)
>
> *"…instructions for working with raw materials are inherently different from other economic goods. Once the cost of creating a new set of instructions has been incurred, the instructions can be used over and over again at no additional cost."* (Romer, 1990: 72)

Romer (1990) in the endogenous growth literature has a special place though; he augments the previous understanding regarding the availability of knowledge as stimuli for technological development. Romer (1990) argues that technological development is a non rival but partially excludable concept (Romer, 1990: 74). Moreover knowledge can be protected by the usage of patents which may direct private investment towards research and development; on behalf of both knowledge accumulation and technological development (Romer, 1990: 77).

Another vital contribution of Romer (1990) is related with the place of human capital in the framework. Human capital combined with the stock of knowledge; help the evolution of the research sector, which produces designs for the intermediate good sector that manufactures durables for the use of the final product. This is where the place of final good production sector arises, using human capital and the intermediate goods to end up with the final product. Thorough out this production process, technological knowledge has two significant impacts; (i) Through its effect in the research sector by being a new technological knowledge, which by somehow can be protected at least for a given period of time by the help of patents; thus partially

excludable. (ii) Through other inventors ability to observe the developments and accumulate their knowledge bases, hence non excludable part of the discussion. While the first fact of the model prevents the spillover effect of the knowledge, the second fact emphasizes that knowledge will spillover and affects the accumulation of existing knowledge. Here the observations will halt and move on to the debates on entrepreneurship growth models. Note that last remarks of the Romerain type of economic growth, related with the accumulation and spill over of knowledge, will be evaluated by combining economic geography and endogenous technological change.

While Romerian types of endogenous growth models are inevitable part of the discussion, economic geographers criticize the insufficiency of the discussion to observe the spatial distribution of knowledge through space. Originating from this critique, a counter perspective during the early 1990s arises by relying on the new economic geography and concentrates on the distribution of economic activity across space; the so called regional firm formation mechanism. Overall while the endogenous growth models define the roots of economic growth and the new economic geography manages to illustrate the regional distribution of economic activity, it is the evolution of a more contemporary discussion to explain the neglected effects of knowledge spillovers from a regional perspective. Background of the new approach is to place entrepreneurial activities in the overall growth theories. Actually both Marshall (1920) and Krugman (1991a) emphasized the information and technology spillover, however they do not discuss the mechanisms deeply. To improve and widen the discussion, the new approach tries to construct a relation between new growth theorists and new economic geography. Actually one may criticize the discussion for repeating the previously discussed mechanisms. However it is evident that the concept of entrepreneurial activities and the role that is played is neglected in the literature. Although the previous studies used the key measures of entrepreneurship, the

motivation behind was different and unexplained. Unlike the previous studies, followers of the new approach specifically underline the concept of entrepreneurship and place the item between new economic geographers and new growth economists.

Connected with these developments in the theoretical frameworks recently Baldwin and Martin (2004) underline that agglomeration is a sign of spillover and knowledge transfer. In that sense; new economic geographers and new modern growth theories have crucial element in common, knowledge in short. Similarly Audretsch and Feldman (2004) emphasize that geography is a vital element to understand the traditional expectations of the new growth models, regarding the knowledge spillover. The understanding is actually an outcome of the rise of entrepreneurship based growth models that also deals with the spatial dimension of the question.

In this view it was Acs and Varga (2002) who first documents the theoretical discussions and/or comparisons regarding; (a) New Economic Geographers, (b) New Growth Theorists, (c) Innovation Based Growth Models. Acs and Varga (2002) discuss that, while Krugman (1991) based new economic geographers manage to answer the question; *"why some economic activities concentrate in certain regions?",* they are insufficient to model the role of technological externalities and growth processes for spatial units. Meanwhile while new growth economists following Romer (1990) manage to endogonise the process of technological based economic growth processes, they fail to explain the key processes and institutions behind the knowledge spillovers. Moreover the regional considerations are also neglected and the expectation of common knowledge absorption is followed. Finally for innovation based models, Acs and Varga (2002) remarks the significance of the transformation of knowledge (both existing and also new) into economically considerable products. However the neglected side of regional issues and the

economic growth problems stand as the weak side of the innovation based models. Acs and Varga (2002) mentions that the insufficiency of each approach makes it a necessity to build up a new model. In this sense the regional development differences should be explained with the help of the agglomeration behavior of certain economic activities in certain geographies. Moreover technological developments' role in economic growth and the factor(s) affecting the process should be lightened. Finally the role of technological advances in the regional economic development should be clarified. This is how a more general regional development model can be constructed according to Acs and Varga (2002: 145).

Later Acs, et al. (2003) by concentrating on the link between new economic geographers and new growth theorists, describe a model in which one can account for the new growth models to work by accounting for the effect of knowledge transformation. Their central research originates from the disparities within high R&D expanding economies. While economies like Japan and Sweden are realizing lower growth rates, others such as Denmark and Ireland stand as growth miracles. If the propositions of new growth theorists are common and applicable to those economies, there should be a missing mechanism in their approach. The background discussion is that; pure knowledge and economic knowledge are different things. Actually knowledge will spillover as the Romerain Type of Growth models predict, however the main concern is whether such a process should be interpreted as an automatic one. In short, what Acs et. al. (2003) do is the substitution of the Romer's question of why knowledge capital affects growth, with how knowledge capital affects growth.

In this framework, major criticism of Acs et al. (2003) is related with the distinction between pure knowledge and commercialized knowledge. The model that is introduced

underlines that the unexplained part of endogenous growth models, how knowledge spillovers, is crucial to understand the disparities between and within nations. In short a mechanism to observe the absorption of knowledge is tried to be constructed. This is where the place of spatial dimension emerges in the framework. As a major criticism to the assumption of evenly distribution of knowledge over space, Acs et al (2003) demonstrates that knowledge spillovers are geographically bounded. Actually the remarks here is strictly connected to Schumpeter (1912) and Hayek (1945), discussing the innovative entry. While both underline the positive innovative effect of the new firms, it is actually the new approach that has to integrate the process into endogenous growth models. In fact the missing link between knowledge and economic growth is best understood by looking at the difference between stock of knowledge and economical knowledge. The framework suggests the existence of a filter between gross knowledge and economically useful knowledge.

> *"....the degree of entrepreneurial activity is shaped by the thickness of this filter; a higher degree of entrepreneurial activity reflects a greater share of the ideas flowing through the filter and being transformed from Arrow's knowledge into his economic knowledge."* (Acs et al., 2003: 17)

The framework is crucial in the sense that, regional disparities can be explained with the help of the spatial differences in exploiting knowledge. Hence it is not only the differences of knowledge stock and investment in knowledge that explains the regional divergences, but also the existence of heterogonous regions in exploitation of knowledge and formation of economically active knowledge. The model is informative and also influential in the sense that in the knowledge of the existing study, the model seems to be the first formal model attempt to discuss the spatial dimension of knowledge and economic growth with special emphasis on

entrepreneurship. The major assumptions of the entrepreneurship based endogenous growth model offered by Acs et al. (2003) are as follows;

(A1) New firms are the sole channel to transform knowledge into an economically active one through spillover. If no firm start up takes place, no spillover effect will prevail, this prevents the accumulation of knowledge and halt economic growth. Moreover in case existing firms add their firm specific knowledge into the process, Acs et al. (2003) assumes that this will be in the form of a new venture.

(A2) New firms are associated with new ideas. As new ideas are essential for knowledge spillovers and as new firms have higher probability to fail due to lack of experience, high new firm entry rate is a necessity for long run economic growth.

(A3) There are only local spillovers. Stock of knowledge is equal to all local entities. The achievement of converting knowledge into economically useful one depends on the absorption capacity of the firms.

(A4) Physical and non-physical conditions of new firm entry differ between regions.

Under these assumptions model tries to define a filter in the form of entrepreneurs – new firms – that converts the stock of knowledge (K) into useful and firm specific knowledge (K^C). Within this framework two types of firm are observed the incumbent firms and start up firms – new firms -.

Incumbent firms (*I)* have a history and their ability to exploit spillovers is determined by path dependence as constructed in equation 2.16 (Acs et al., 2003: 22). The already firm specific knowledge has two major implications. Size of the firm specific knowledge limits the firm i's (in industry j) absorption capacity of knowledge spillover from K. Moreover most important expectation of the model is related with the path dependence of the firm specific knowledge.

[2.16] $$k^{I}_{i,j,t} = f(\int_{t=0}^{\infty} k^{I}_{i,j,t}, K)\,,\ \sum_{i,j}^{n} k^{I} = K^{I}$$

On the other side of the story, new firms, start ups (S), have no history thus knowledge spillover is free from the path dependence. The only vital determinant of the process is the entrepreneurs' ability or absorption capacity to exploit the opportunities coming from the overall spillovers as illustrated in equation 2.17.

[2.17] $$k^{S}_{i,t} = f(K)\,,\ \sum_{i,j}^{n} k^{S} = K^{S}$$

In any way both firms, by somehow contribute to the knowledge spillovers through their role in the commercialization process of the gross knowledge. Overall economically useful knowledge-K^{C}-can be decomposed and be shared between incumbent and start up firms as

follows; $K^C = K^{cI} + K^{cS}$, where $K^{cI} = \theta K$ and $K^{cS} = \lambda K$. Overall revisiting the assumptions of the model, if new firms are the only way of knowledge spillovers, then the share of entrepreneurs (λ) is a vital part of the production function as an augmentation of the neoclassical growth models and endogenous growth models. Within this introduced model if entrepreneurs through their ability and necessity to absorb and transform knowledge is a necessity then their spatial distribution is also an essential part of the regional development concerns.

While Acs et al. (2003) is vital in the sense that its is one of the first attempts to model the place of new firms in the process of knowledge spillovers, assumptions of the model are observed to be strong, such that it prevents existing firms to contribute to the knowledge spillover. However later again Acs et al. (2005) revisits their construction and diverts the discussion towards the choice of an individual to be an entrepreneur or to continue working as a wage earner. In this understanding the expected payoff for becoming an entrepreneur should be higher that individuals shift towards self employment. Hence policy implications towards the subsidization of entrepreneurs seem to be a necessity. In the constructed model, entrepreneurs are vital in the sense that they at the end decrease the thickness of the filter that is observed between the knowledge and economically useful knowledge. Acs et al. (2005) remarks that for a high R&D investing economy to realize high economic growth two major items should be satisfied;

> *"First, knowledge has to be transformed into economically useful knowledge, and, second, an economy must be endowed with factors of production that can select, evaluate and transform knowledge into commercial use. If these conditions are not fulfilled, an increase in the knowledge stock may have little impact on growth. Moreover, economies endowed with small knowledge stocks may experience higher growth than regions more abundantly endowed with knowledge due to a less impeding knowledge filter."* (Acs et al. 2005: 8-9)

From a similar perspective Audretsch and Keilbach (2004) remarks that knowledge enters the production function after it is exploited and transformed into an economic one. Both Acs et al. (2003) and Audretsch and Keilbach (2004) underline that knowledge while represents an opportunity which may lead to economic growth, the prerequisite of the mechanism to work is the existence of a party to discover and exploit the knowledge. Discussion regarding the missing gap in the knowledge spillover process influences theorists to find a place for entrepreneurial activities as to transform knowledge into a commercialized one. The significance of the model is the followed perspective of evolutionary view. New ideas play a crucial role in the form of a filter that Audretsch and Keilbach (2004) define, which transforms the knowledge into economic knowledge. This process is explained by the help of increasing diversity affecting economic growth and development positively.

> *"Thus entrepreneurship is an important source of diversity by transforming knowledge into economic knowledge that otherwise would have remained uncommercialized"* (Audretsch and Keilbach, 2004: 608)

Overall Audretsch and Keilbach (2004) try to search for the relation between entrepreneurship and regional growth. Their hypothesis is that; regions with high start up rates (accounting for entrepreneurship) will have higher diversity which in turn will cause the regional employment figures to increase (accounting for regional economic development). To test the hypothesis, regional labor productivity is preferred and a number of regional social and economical indicators are used with the inclusion of an entrepreneurial behavior indicator; new firm formation rate. Their findings for Germany underline that; three types of entrepreneurial activity (General Start Up Rate, High Technology Based Firm Start Up Rate and ICT Based Firm Start Up Rate) affect the labor productivity of regions of Germany positively.

2.6.3 Evidence for the Impact of New Firms on Economic Growth

Before moving towards the evidence on the dynamics of the firm formation, it seems to be a necessity to direct and underline the major empirical findings that aim to link new firm formation and impacts on economic growth and development. This will give a general insight about the major reasons of investigation of such a framework. In this sense Fritsch (1996) is one of the first that direct a question on the mechanisms between firm formation and economic growth. The area of the study is West Germany and the unit of analysis is the 75 West Germany planning regions for the period of 1986-1989. Other than entry and exit rates, which are defined relative to the total establishments, a new measure called turbulence is introduced; the sum of the all entry and exits relative to the total establishments. To account for the regional development, change in the employment figure is preferred. When the correlation between employment change and the different measures of firm activity (entry rate, exit rate, turbulence rate, and net entry rate) are observed for manufacturing, services and all sectors separately, the study underlines that a clear pattern between the indicators can not be constructed. Both the time dimension and the sector dimension effects the correlation coefficient. To have a deeper understanding the investigation is carried out to a multivariate analysis constructed for each of the years for 75 cross sections separately. The final underline can be the presence of a positive relationship between firm formation and regional economic development especially for manufacturing industry.

In another study, Audretsch and Fritsch (2002) define different growth regimes and try to evaluate the consequences of each of them on by one. The discussion relies on the trade off between the possible positive effects of new firm start ups and large incumbent firms on

economic growth separately. The hypothesis is the probable deviation of the relationship for different regions and localities. Findings underline that no unique policy recommendation can be made, however the place of new firms similar to the incumbents is a vital part of the story.

> *"…in some regions large enterprises are more conductive to growth, while in other regions small enterprises are the engine of economic development."* (Audretsch and Fritsch, 2002: 114)

> *"Just as some regions achieve relatively high growth rates by concentrating on established, large enterprises, other regions achieve the same goal by focusing on new firm start-ups and a more turbulent enterprise structure"* (Audretsch and Fritsch, 2002: 121)

In a similar fashion, Holtz-Eakin and Kao (2003) is also another important study that aims to link entrepreneurial activity and economic growth. The researched background mechanism is the possible gains in productivity. Productivity is measured at the state level by using Gross State Product (GSP) per worker for US for the period of 1986-1998. Here employment figure that is used contains all part time and full time workers for the period of 1969-1997. The combined indicators yield the productivity measure for 50 states and for 9 major industries; manufacturing, transportation, communications, public utilities, wholesale trade, retail trade, finance, insurance, real estate and services. Meanwhile for the other side of the relationship, to account for the climate of entrepreneurial behavior, firm birth and death rates are calculated. Within this context the relationship between firm birth & death as entrepreneurship indicator and productivity as the economic growth indicator is observed by using a dynamic panel data setting. Preliminary findings underline that productivity gains show substantial persistence. An original increase in productivity seems to last for 13 years. Moreover the effect observed nearly for each states seems to be positive. In the dynamic context different panel data techniques are preferred and results underline that for the Holtz-Eakin, Newey, Rosey's

Generalized Measure of Moments (HNR-GMM) technique to estimate dynamic panel data, productivity is positively related with firm birth and deaths. Moreover when the lagged values of the relationship are observed the mentioned relationship continues to exist. However when within group estimation technique is used to control for the states specific effect, result seems to be different; now lagged firm and death rates are associated with lower productivity.[19] Overall while results seem to be sensitive to the dynamic panel data settings preferred, complementary descriptive view confirms that firm birth and death rates are associated with productivity gains.

On another note, Fritsch and Mueller (2004) define direct and indirect mechanisms between firm formation and regional growth. The direct effect is over the creation of new firm start ups and job creation. The indirect effect is observed over four different channels; (i) Securing efficiency that causes all firms to operate more efficiently due to increasing competition, (ii) Acceleration of structural change, that the turbulence of firms is a process of substitution of the incumbents by the new comers, (iii) Amplified innovation which directs the profits toward R&D instead of distributing the profit. (iv) Innovative entry may result in increasing number of products through the line of production and also usage of the products. The study next tries to understand the lag structure of the effect of new firms on regional employment change over these direct and indirect mechanisms. Findings of the study are vital in the sense that traditional view that underlines the positive effect of new firms over job creation process, thus direct effect, is questionable. Findings of the study underlines that the defined indirect mechanism are more effective than the direct one. The background is that, even the new comers fail there still exists a mechanism that works on behalf on regional development through indirect effects over incumbent firms. The presence of this effect will take some time, which the study

[19] The dynamic panel data and estimation procudeures will be discussed in details in chapter 4.

identifies over the lag structure of the process. The short run effect may be negative (for the first 6 7 years) however in the long run the there will be a positive effect on regional employment.

In this setting finally Acs and Varga (2005) discuss the relation between entrepreneurship & technological change and agglomeration & technological change separately by using Global Entrepreneurship Monitor (GEM) data set for European Union. The core idea of the model is defining spillovers as a function of entrepreneurial activity and agglomeration. Spillover effect is measured by the number of the patent applications. Research and investment in knowledge is measured by the R&D expenditures. To account for the agglomeration effects, an agglomeration index is preferred; share of city regions' employment where number of employees exceeds 500,000 in the overall country employment. Meanwhile entrepreneurial activity is investigated by using total entrepreneurial activity (TEA) which is developed in the GEM framework. Overall study tries to model knowledge as a function of technology level, R&D expenditure, entrepreneurship and agglomeration. The results help one to discuss the effect of R&D in the absence and existence of entrepreneurship and agglomeration. Results are definitely not the same, signaling the positive effects of entrepreneurship and agglomeration through knowledge spillover process. Following Acs et al. (2003), Acs and Varga (2005) underline that technological change while represents an opportunity for economic growth, such and opportunity will face with a danger to vanish in the absence of new agents in the form of entrepreneurships. Moreover the expected positive effect of agglomeration is mentioned with a special emphasis on geographic concentration of R&D activities empirically.

2.7 A Review of the Dynamics of New Firms' Localization

Krugman (1991a, b and c) and later Fujita et al. (2001) manage to theoretically link a number of propositions on the dynamics of economic activity with regional distribution of production. Propositions of Krugman demonstrate the factors that are taken into account by apparent production units through localization process. Observing these discussions call for the search of applied studies to investigate the strength of the relation. Here the concern should be wider than the specified discussion of Krugman; though the statements can easily be extended towards a new question; *"What are the motivating factors behind firm formation, regionally?"* Two major issues are specified to test the propositions. First; choice of a measure to account for regional firm formation potential is a necessity. Second; selection of the basic indicators to evaluate the sensitivity of firm formation to proposed local properties. [20]

The major empirical studies testing the localization hypothesis are clustered around the post 1990 era. Early findings generally rely on cross section observations. However with the rise of data availabilities for wider time spans and technical developments, more complex panel data models are structured in early 2000 period. This section will review both approaches and will give brief information about different dynamics realized in different economies.

Fritsch (1992) chooses West Germany as the study area; by concentrating on the structure of the manufacturing as well as services sector and taking into account the major characteristics of regions, models the dynamics behind the firm formation dispersion. While low

[20] See chapter 4 for a brief discussion regarding dispersion measures and indicator selections.

unemployment rate stands as a motivation for high firm start ups, size effect of firms, which is measured by the share of small firms within a region, has a negative effect on the firm formation. Moreover the structure of the labor force; with a special emphasis on skill level, is also found to be significant. The availability of well skilled labor force is one of the major stimuli for firm formations.

Later Davidson et al. (1994) for Sweden built up a model to search for different relationships. For firm formation measures, dispersion is discussed both at the regional level and also at the sectoral level. After observing the distribution of new firms, firm formation measures are linked with regional development measures. Overall findings underline that, effects of major determinants discussed (social-demographic, market size, unemployment measures, and capital availability measures) varies between regional analysis and sectoral analysis. While Davidson et al. (1994) remarks dynamics behind the firm formation, more importantly observes that; regional development measured by regional job creation measures is positively affected by the regional firm formation.

On another study, Keeble and Walker (1994) for UK, try to search the spatial patterns and determinants of firms at different levels in their life cycles; start ups, smalls and deaths. The cross section model covers 1980-1990 period for different industrial activities; production (mostly manufacturing), finance, business and professional services. For the overall economy new firm formation seems to be dominated mostly by population growth, population density, (%) turnover in legal units less than 500,000 pounds, non-manual workers share in the active population. Meanwhile industry is mainly affected by similar indicators as the overall economy, whereas services under concerns are also affected by change in per capita income, average house

purchase price and change in unemployment. In addition to that, when small business growth is observed for the total economy, results indicate that change in population, house purchase price and share of Labor and Nationalist councilors on local councils are effective. Also the sectoral decomposition when observed, production seems to be following the overall economy with additional indicator of change in unemployment. Note that services are again affected by a different measure of house purchase price. Finally firm deaths are observed. For the overall economy new firm registrations is affecting firm deaths. In the context of the ongoing study here major remark can be given to the determinants of the new firm formation; population growth as an indicator of demand potential, house prices as an indicator of capital availability, urban demand, and occupational structures are effective in the process.

Similarly Audretsch and Fritsch (1994) focusing on Germany tries to understand the geographic distribution of production in the framework of Krugman (1991a); (i) pooled labor markets, (ii) pecuniary externalities, (iii) technology and information spillovers. These discussed issues are regarded as the background of the reason of regional differences of production. For Germany, 1986-1989 period is evaluated for all sectors, manufacturing and services separately. Ecological approach standardization methods indicate that unemployment rate is a determinant for all sectors and manufacturing but not for services. Population density is effective for all sectors, manufacturing and services.[21] Quality of labor force and also per capita value added is also vital determinants for firm formation. Finally mean establishment size also found to be significant in the model. When the same understanding is applied by following the labor market approach, results indicate a negative effect coming for the unemployment rate. Background is related with the definition of the labor market approach, which assumes that firms are formed

[21] Discussion of the standardization of new firms will be done in chapter 4 in details.

from the existing labor force base. Thus increasing unemployment rate is an indication of declining propensity of forming new firms.

Hart and Gudgin (1994) examines the 1980-1990 period in the Republic of Ireland. Determinants of new firm formation are grouped under four major headings; (i) Macroeconomic Factors, (ii) Microeconomic Factors, (iii) Personal Skills, (iv) Environmental Factors. For 1980-1990 period 27 counties of Republic of Ireland are observed. In this setting firm formation indicators used are gross and net surviving firm formation rates based on two different standardization methods of the literature. Overall results indicate that, access to higher education is a vital but negative determinant of the firm formation. The understanding is related with the career choices of university graduates assuming that these individuals are the ones forming new firms. Change in employment is a positive vital determinant of the firm formation in favor of demand motivations. Finally urbanization measure negatively, managerial occupations positively affecting firm formation measures.

On another study Garofoli (1994) tries to link regional development and firm formation process for the case of Italy. By criticizing the traditional standardization measure of ecological approach, study prefers to normalize the new firm registrations. The period under concern is 1985-1991. Preliminary observations underline that sectoral distribution of firm formation matters; while historically the formation rates are found to be relatively stable other than financial services, the difference between sectors are significant with the trade industry as the leading one. The followers are as follows; construction, light industries, mechanical industry, finance and business services, other services, agriculture, heavy industries, energy industry. The second observation is regarding the spatial distribution of firm formation, with the so called Third Italy

as the leading region. After capturing the descriptive picture of the firm formation, the core observation is diverted towards the determinants of the variation of the firm formation. To understand the phenomenon total economic activity and manufacturing industry activity is evaluated separately by calculating their firm formation ratios. Results underline that index of specialization of the local industries is an important and positive determinant of regional firm formation. Proportion of self employment in manufacturing industry and the economy as a whole is a vital positive determinant of the firm formation; the link is channeled from entrepreneurial spirit. Another crucial finding is related with the share of manual workers, with a significant negative effect on firm formation rates. Finally firm's size structure within the regions is effective in the process; with small firm presence affecting firm formation positively.

As an important study among the vast literature Reynolds (1994) defines the autonomous dynamics of firm birth for US. The constructed hypothesis of the study is two-fold. One to understand the dynamics behind the process, second to question the importance of observing regional firm formation for regional development concerns based on the job creation hypothesis. Concentrating on the latter hypothesis, Reynolds (1994: 435) underlines that just questioning and discussing the regional economic activity in the form of firm formation will not be a sufficient analysis to understand the local development issues. The background is associated with the possible high death rates in the areas with accelerating new firm formations. The relationship between the firm formation and their dynamics is evaluated for manufacturing, business services and all economic sectors. The unit of analysis is the aggregated 382 labor market areas of US for 1980s. Results underlines that local demand based factors are vital and positively affecting firm formation in all economic areas under concern. Moreover urbanization, agglomeration, personal household wealth, presence of small firms, economic specialization are

effective in the process; however results seems to differentiate between the economic activities under concern. Finally study remarks the absence of strong relationship between government expenditures and local firm formation activities.

Guesnier (1994), by concentrating on the job creation mechanism of the new firm formations, tires to evaluate the determinants of firm formation in France. Evidence underlines that between 1976 and 1989 the employment creation process is motivated by the small firms. The complementary analysis regarding the sectoral distribution of the effect of the small firms on employment is crucial in the sense that sectors outside manufacturing and construction which are transportation and retail oriented toward household and firms serving other businesses are found to be the motivators of the process. Moreover the spatial patterns of the process when considered, the study finds it necessary to underline that the production system which is heavily affected by the behavior of firm births and deaths, is a vital determinant of the regional employment variations. Overall the discussed issues are the background motivation of the study to concentrate on regional factors affecting firm formation in France. The model is constructed for 97 French departments for the period of 1986-1991. Based on the two standardization measures results seem to be striking. Five major types of localizations are defined for France. Urban areas with increasing population densities are the areas of accelerating firm formation measures mainly in services sectors requiring more qualified labor. Residential and touristic areas are also found to be witnessing increasing firm formation rates which are mainly influenced by the geographic factors of the localities. Rural manufacturing areas are similar to the Marshalian (1920) framework which is later augmented by Krugman (1991). The districts realize a limited spillover for the interior areas with limited opportunities for firm formation. As an augmentation of the rural manufacturing districts, technologically developed areas may evolve with stronger

connections to urban areas. These areas rely on more complex and developed networks, thus defined as a variation from manufacturing as a more complex production locality. Finally locally integrated areas are defined, which actually is just the augmentation of the overall defined four areas. The evolution of the process consists of productive systems, innovative/traditional sectors that construct a new special network.

Meanwhile Reylnolds et al. (1994) contributes to the growing literature by making a cross country comparison and tests the different aspects of firm formation for a set of countries. The study is conducted for the major developed economies of the European Community of 1990s; France, Germany (West), Italy, Sweden, UK. Four major motivations are underlined to examine the new start ups; (i) Job creation property of new firms, (ii) Innovative activities of new start ups, (iii) Importance of career option for self employment, (iv) Among the investigated economies the regional development disparities are parallel with the variations of the firm birth rates. Based on all economic sectors and manufacturing sector separately, initial findings of the study underline that there is considerable variation in firm birth rates across the countries under concern. However the within country illustration when observed, findings are vital, underlining the high and stronger disparities between regions of countries. Based on this finding remaining part of the study is devoted to the construction of a framework as to capture the background of this variation. A set of social and economical indicators are listed for each of the country under concern. Results remark that, growth in demand, urbanization/agglomeration, presence of small firms and political ethos are positive determinants of firm formation for all economic activities as well as for manufacturing sector. However for unemployment while a positive effect is illustrated for all economic sectors, for manufacturing findings are mixed. Moreover while the personal wealth as an indicator of capital availability is a positive dynamic for all economic sectors, for

manufacturing no significant result is reported. Finally government spending seems to be a negligible factor for all economic sectors under concern, however a weak but a positive effect is observed for manufacturing industry alone. The importance of the study is twofold. First the possible difference in the dynamics of new firm formation between countries is illustrated. And second of all examining each dynamic for different economic activities is underlined once more.

From a different perspective, Lee et al. (2004) tries to link creativity and entrepreneurship and search for the probable effect of regional diversity on firm formation. The study is unique in the sense to use a different set of regional indicators. The proposed mechanism deviates from the literature by using creativity, diversity and a sound climate to allow for these two factors. Data set cover the regions of US. The classifications used are, Metropolitan Statistical Areas / Primary Metropolitan Statistical Areas and Labor Market Areas. While general outlook of the economy is examined by using all sectors, a complementary analysis is also done by using manufacturing and services. Findings underline that creativity index, which is measured by using artisans and bohemians of the region, is a positive and significant determinant of regional firm formation for all sectors under concern. Melting pot index as an indicator of diversity which is computed by computing the share of foreign born of the region, is a negligible factor of the process. Another diversity index of gay index is significant and positively affecting the process just for service industries. Human capital index that is the percentage of adults with bachelor degrees and above affect firm formation positively for services and all industries however the same significant effect turns out to be negative for manufacturing. Population is an insignificant determinant of the process, growth in regional income affects the process positively and significantly other than manufacturing. Patents per head, as an indication of creativity and

innovation, is significant for manufacturing industry. Finally population growth as an indicator of demand potential is significant in all of the sectors under concern.

More recently Grilo and Thurik (2006) concentrate on Euro area. Observations are important as it accounts for entrepreneurial activities' significance by comparing the developed and developing (transition economies) of Euro Region. While the major difference between these two groups of countries is marked as the administrative complexities of developing ones, other measures such as financial capital availability is also underlined. Entrepreneurship as the dependent variable can be measured by; start up activity, business ownership, small business share, nascent entrepreneurship and preference for entrepreneurship. Grilo and Thurik (2006) determines the following independent variables; Ability, risk tolerance, liquidity constraints, resources of individuals (for entrepreneurs). Moreover common measures of age, gender, race, education, capital assets, previous professional experience, martial status, professional status of parents are also discussed. Using Flash Euro barometer survey on entrepreneurship conducted in 2004, following finding is underlined; Being risk tolerant increase the probability of becoming an entrepreneur in transition economies of the area mostly. Moreover respondents to the survey from the transition countries mainly underline the obstacles coming from the lack of financial support, complex administrative environment and unfavorable economic climate.

These listed studies are vital as they open up the way of the empirical studies in the mid of 1990s. However when the ongoing discussion is observed by looking at the more contemporary studies, the rise of panel data usage is observed clearly. Although most of these studies continue to work on developed nations, shift in the econometric models used is a vital development.

Through this debate, Johnson and Parker (1996) is a vital study done for UK. The study can be labeled as one of the first attempts to use a panel data setting among the new firm formation literature. The death and birth of firms are evaluated for UK and a set of social and economic variables are related with the process. The major contributions of the study are the interdependence of firm births and deaths and second of all the possible endogeneity of the social and economic variables. For UK counties for a very limited time period 1988-1990 a panel vector auto regression (VAR) setting is illustrated. A VAR(3) is constructed and the following results are underlined; (i) There seems to be a little interdependence between firm births and firm deaths, (ii) There is a circular causation issue in the mechanism between firm formation and the development in the regional social and economical indicators under concern. As emphasized these underlined results make the study unique in the literature.

By 2000s, first Kangasharju (2000) investigates the dynamics behind firm formation rates for the period of 1989-1993 in Finland (both cross section and also panel data techniques are used). The unit of analysis is NUTS 4. While comparison between cross section and panel data models is a vital part of the study, comparison of the results with the previous findings of the literature is also influential. The preliminary remark of the study is the co movement of the new firm formation numbers with the general behavior of the economy; hence the period under concern witnessed a major financial depression for the Finnish economy, which can also be observed by looking at the overall macroeconomic picture. By applying the labor market approach advised by Evans and Jovanovic (1989) to normalize the firm formation numbers; calculating the number of new firms relative to the number of workers in thousands, a number of social and economical indicators of Finnish economy are observed at the regional level. These

measures are as follows; To account for the market growth, growth of regional per capita GDP, rate of in-migration and growth of population is preferred. To account for the effect of agglomeration (or urbanization) population density is preferred. To account for the entrepreneurial abilities a firm size measure is introduced by calculating the number of employees in a sub-region relative to the number of establishment. To account for the effect of public policy, local government expenditures per local inhabitants is computed. To search for the possible political effects on the business sector, share of socialists in local parliaments is used. To understand the presence of a relationship between labor market and firm formation, local unemployment level and also its growth is computed. Finally to search for the liquidity constraints of new firms start ups, proportion of dwellings that are owner occupied is injected to the model as an indicator of equity finance. Preliminary findings indicate an increasing variation of firm formation rate through out the sub regions of Finland. Overall empirical findings underline that most significant determinant of firm formation in Finland is average size of establishments. Demand variables of population growth and GDP growth are found to be insignificant. Moreover the urbanization – or agglomeration – measure of population density is also found as a negligible dynamic. Unemployment level while observed to have an effect, the sign of the effect is ambiguous, and in addition to that change in unemployment level has no effect on the process. Another discussion is related with the infrastructure of local units; unlike the common expectations local government spending acts to affect the process negatively. The discussion regarding the capital availability which is measured by household wealth (owner occupied dwellings) acts as an insignificant measure in the analysis. Overall findings for Finland underline the significance of self employment and the increasing share of small scale based firms. Another crucial finding of the study is that; cross section findings of the empirical part are in line with the previous literature around 1994 that follow cross sectional understanding. However

panel data findings seem to deviate from the cross section data models' results; especially demand based indicators of the model.

In a similar way Berglund and Branas (2001) reviewed the firm entry and exit behavior of Swedish business units - plants - for the period of 1985-1993 at the regional base for eight different industries. Findings of the study are important in the sense that; previous result obtained by Davidson et al. (1994) regarding the significance of sectoral differences in the dynamics behind the regional firm variation picture is approved. Hence as an augmentation to the cross section and time dimensions of the models, asking similar question by making an industrial categorization is informative. It is the possible difference between industries that the study aims to compare and comment on. Agriculture, mining, manufacturing, electricity, construction, commerce, transport and financing are the major economic activities discussed (based on the classification of International Standard Industrial Classification - SNI -). For each regional unit following explanatory social and economic indicators are used; To account for the local market total and average regional income is preferred. Unemployment rate is used to understand the labor market and entrepreneurship potential of regions. As a measure of agglomeration population density for regions is computed. To control for the size effect firm size measure is introduced, the ratio of employees in small plants and population between 16-64. As an indicator of education quality and skill of the labor force, number of individuals with education at university level divided by the regional population is used. Finally local subsidies are added to the model by using the regional government subsidies. Findings of the study are crucial in two senses. First of all, similar to the findings of Davidson et al. (1994), sectoral dimension of he model is vital. Firm entry and its determinants seems to vary across different sectors as illustrated in table 2.2. Moreover the survival probability of the new plants, which are computed by taking

into account the exit behavior of the activities underline the divergence between the sectors of Sweden. Overall findings underline the need for a sectoral comparison to understand the overall behavior of the economic activities spatially.

Table 2.2: Determinants of Firm Entry for Sweden Based on SNI (a)

	Agriculture	Mining	Manufacturing	Electricity	Construction	Commerce	Transport	Financing
Income	-	+	-	-	+	+	-	+
Size	+	+	-	-	-	+	+	+
Unemployment	-	+	-	+	+	+	+	-
Local Subsidies	+	+	-	-	-	+	+	+
High Skill	-	-	-	+	-	+	-	-

Source: Berglund and Branas (2001)
(a) Illustrated based on Berglund and Branas (2001)

Meanwhile Fritsch and Falck (2003) is also another study which aims to answer the same proposition following a similar understanding. Their multi level analysis observes the new firm formation in West Germany by industry (manufacturing, services are the economic activities discussed) over time and space (period under investigation is 1983-1997). Study observes the dynamics of firm formation by building up three separate models for; manufacturing, services and overall private sector. Following the ongoing literature the firm start up numbers is normalized by using the labor market approach. Initial findings underline that there seems to be high variation between industries and in this context service sector realizes higher start up rates relative to the other observed industries in West Germany for the period under concern. When the spatial distribution within industries is observed higher firm birth rates are observed to be in agglomerations for service sector, in modestly congested areas for manufacturing industry and in

rural areas for the other remaining industries. When overall variation of firm formation is observed the multi level model underlines that the variation is highest across industries, next across regions and finally over time. The vital part of this finding underlines the necessity to add a sectoral dimension to the questions formed once more. Following the ongoing empirical literature, model prefers the following explanatory variables; Number of employees is used to control for the potential entrepreneurs. Number of unemployed individuals is used to understand the pool of available labor volume for starting up new business units. A size indicator is used by ordering the establishments by the number of employees and the 75^{th} percentile of these establishments is preferred. As a complementary indicator, small firm presence is introduced, where small firms is defined by employees with less than 50. To account for the technological concerns, R&D employees in establishments with less than 50 employees relative to the overall R&D employees of the region and industry under concern are computed. To understand the capital intensity gross capital assets over the number of employees is calculated. As an indicator of unit cost of labor, gross income from independent work per employee over gross value added per employee is computed. To control for capital unit cost, nominal interest of government instruments (10 year) minus inflation rate plus depreciation rate of gross fixed capital investment is injected. Finally for demand base and the effect of urbanization or one may also call as agglomeration; percentage change in gross domestic product and population density is preferred respectively. Note that all industry specific variables under concern are constructed for regions and industries. Results of the study is illustrated in details for the defined industries of West Germany (Fritsch and Falck, 2003, pp.20-22). Overall findings seem to be supporting the ongoing empirical and theoretical discussion. Through out the overall findings a number of issues can be underlined here. Unemployment has a significant negative effect on the new firm formations. Minimum efficient size effect can be the background of the positive effect of the

presence of small firms in the regional context. Finally study demonstrates and remarks that entrepreneurial character of the industry and the region positively affects firm formation.

On another note, Sutaria and Hicks (2004) by using a micro database, construct a model to search for the exit and entry behavior of manufacturing business units in Texas for the period of 1970-1991. The geographic unit of the analysis is Metropolitan Statistical Areas (MSAs) and Primary Metropolitan Statistical Areas (PMSAs) in the state of Texas. The selection of the geographic area makes the study unique in the sense that, the literature is dominated by cross section and panel data studies done for regions of national economies; whereas Sutaria, Hicks (2004) concentrates on local areas of a specific region of US. As to standardize the firm birth numbers, ecological approach is used; firm birth numbers relative to the number of already formed firms in that region. The model constructed aims to shed light on the regional distribution of the firm formation; hence ten different variables are used. To understand the local market demand, annual population growth and annual per capita personal income is used. To understand the conditions of the labor market, unemployment rate and the change in the unemployment rate is injected to the model. Meanwhile industrial restructuring is evaluated by using four different measures. The rate of change in the producer services' share of total regional earnings, mean establishment size, rate of firm exit, lagged firm entry are the ones. In line with the liquidity constraints hypothesis, per capita bank deposits is used. Finally public policy and the role of central government are controlled by using local government spending. Findings are contradictory. The local market demand seems to be a negligible factor in the framework of local firm formation. Meanwhile the local labor market effect is mixed; while unemployment rate is insignificant, its change through out the period is associated with declining firm formation rates. When the industrial restructuring indicators are observed; MES affects the firm formation

positively, lagged entry rate and the exit rate affects the process positively. Finally local bank deposits are also found to be a vital positive determinant of the firm formation. Overall the study has two vital properties. First, as mentioned above the geographic area chosen is vital as it seems to be unique. Second findings are contradictory to the major traditional measures of new economic geographers; especially local market dynamics.

Recently Bosma et al. (2006) investigated the geographic distribution of the regional economic activity for Netherlands for the period of 1988-2002. The central theme of the study is localization and urbanization; however a number of traditional measures that is expected to affect regional economic activity are also used as control variables. In the general framework of the literature the study has two major strength; using two distinct measures for economic activity; new firm start ups and new subsidiaries and using two major industries; services and manufacturing. Actually the study as a major contribution underlines that motivations behind new firm formation and new subsidiary formation are quiet different. Moreover the sectoral dimensions of the relationship should also be controlled for if one aims to have a more narrow understanding for the localization hypothesis. Within this framework the expected effect of localization on different forms of regional economic activity for special industries may diverge.

"...localization economies and urbanization economies may have a strong impact on the number of new subsidiaries as compared to the number of independent start ups." (Bosma et al., 2006).

The debate is illustrated for Netherlands at the NUTS 3 level. For standardization issues two important assumptions are constructed; while new entry is normalized by the existing labor

force, new subsidiaries are standardized by using the existing stock of firms. Such an understanding clearly highlights the borders between new firm formation and subsidiaries formations. As noted above two different agglomerations indicators are preferred; localization and urbanization. Localization is accounted for by using number of existing firms in the region relative to the regional population. Urbanization is controlled by computing the percentage of people in the region under concern that lives in the highly urbanized areas. Meanwhile a number of control variables are also included to understand the demand and supply effects. Regional growth in value added, growth in wage rate, population growth between three and one lagged years. New regional unemployed people relative to regional population is injected. A dummy for the presence of university is used to discuss the education quality. Overall results are aggregated under three major items; (i) urbanization has stronger impacts on formation of new subsidiaries relative to new firm start ups, (ii) localization has stronger impacts on new firm start ups, (iii) overall agglomeration has stronger impact on manufacturing industry relative to service sector.

Overall as one can easily realize similar to the early studies of 1990s, contemporary studies also continue to cover the developed economies. Studies regarding developing economies are rare. Unlike the vast literature there are studies investigating Turkey as a case study among the developing economies. For Turkey, three manufacturing sector based studies are constructed (Kaya and Ücdogruk; 2002, Gaygisiz and Koksal; 2003, Gunalp and Cilasun, 2006). While these studies are influential for shedding some light on the dynamics in Turkey, they all fail to cover the sectoral differences in the dynamic based observation. The common property of all analyses is the observation unit of manufacturing sector. However studies differ as Kaya and Ucdogruk (2002) observes the historical dispersion of firm entry and exit across the sub sectors of manufacturing industry, while Gaygisiz and Koksal (2003) follows to make a historical

observation of firm formation in the overall manufacturing industry (only) by making a regional specialization. Similar to Kaya and Ucdogruk (2002), Gunal and Cilasun (2006) also works on the manufacturing industry without making a spatial observation.

Kaya and Ucdogruk (2002) is vital in two senses for the ongoing study. First of all area of study is Turkey. Second of all unlike the studies reviewed, the core debate of the study makes an investigation on both entry and exit from a different point of view. The entry and exit behavior of manufacturing firms are investigated for 4-digit ISIC levels for the period of 1981-1997 without making a geographical classification. Following the traditional view of industrial organization, possible channels are investigated. Note that the theoretical background of the study is connected to Geroski (1991 and 1995). The origin of the ongoing study will not enter this dimension of the literature however observing Kaya and Ucdogruk (2002) is still influential as the area of the study is Turkey. Following Geroski (1991 and 1995), and Carree and Thurik (1999) four different categorizations are built; Environmental Characteristics of Industries (demand and cost conditions), Stage of Industry's Life Cycle (advertising intensities, capital requirements), Strategic Behavior of Incumbents (concentration rate of industries), Business Cycle (growth and profit rates). After observing the general pattern for entry and exit rates, for the period of 1981-1997 by using the manufacturing industry censuses (1980-85-92) and annual manufacturing surveys (for the remaining years) dynamic panel models are constructed. For calculating the entry and exit rates for each sub sector new firm formations are normalized by the existing stock of firms. As mentioned above the determinants used here are influenced by the industrial organization view. Profit margin is computed by formulating difference between value added and payroll to total assets. Sectoral output growth is computed by calculating the growth of total output of the sector. To understand the capital intensity of the sector, depreciation relative

to the number of employees is preferred. For understanding the productivity of labor, ratio of value added relative to number of employees is injected. Meanwhile level of concentration is computed by using Herfindahl index. As an entry barrier advertisement intensity is calculated by relating total advertising expenditures to total output. Another crucial aspect is related with the wage rate which is defined as the total wage paid to wage earners relative to number of employees. Moreover coefficient of variation of wage rate in the industry is used to control for wage rate differentiations. Finally coefficient of variation for value added is used to understand productivity differentiations. Overall results indicate interesting findings. Results underline that firm entry is mainly affected by; profitability of sectors (+), capital intensity (-), concentration rate (-), growth rate (+), meanwhile firm exit rates are affected by; firm entry rates (-), growth rate (-), capital intensity (+), concentration ratio (+).

Meanwhile, Gaygisiz and Koksal (2003) follows the central literature regarding new economic geographers. Major hypothesis of the study is connected with the developments in the empirical literature of 1990s. Manufacturing industry firm formation rate (for registered firms) are calculated by following ecological and labor market approaches for urban areas of Turkey. Both cross section and also panel data techniques are used at the NUTS 3 level for the period of 1985-1990. For standardization issues of the regional firm formation numbers traditional approaches of labor market approach and ecological approaches are preferred. For understanding the determinants of manufacturing firm formation a number demand, supply and policy side indicators are used. On the demand side of the relationship, annual growth rate of real per capita GDP and annual growth rate of population are used. On the supply side of the relationship to understand the possible effects of urbanization and agglomeration economies, population density and immigration rates are preferred. For understating the quality of the labor force number of

university graduates relative to labor force is computed. Meanwhile effect of occupational qualifications is measured by the ratio of technical professions in the labor force. The unclear effect of unemployment is measured by the level and the change of the unemployment rate. For entrepreneurship potential average firm size and share of entrepreneurs in the labor force is computed. On the finance side, to control for the possible effect of financial capital availability annual growth rate of bank deposits is preferred. Finally for the policy side relationship the share of the region in the government expenditure is used. Preliminary results indicate the high density of firm formation for the west sides of Turkey. Empirical findings are grouped under two major headings; cross sectional findings and panel data findings. The cross sectional models are again grouped. First models are constructed by using all variables by using two standardization methods separately. Next due to statistical concerns education quality and entrepreneurship indicators are dropped and again by using two standardization methods models are constructed. For a final concern heteroscedasticity problem is solved by calculating robust standard errors. For the preliminary observation results indicate that population density positively, education quality negatively, occupational quality positively affecting the firm formation. However, when education quality is dropped only population density seems to be an important determinant of firm formation. Note that results are also clarified by the models that prefer to compute the robust standard errors for the analysis. Moreover the standardization method used does not directly affect the overall empirical findings of the analysis. Finally dynamic panel data method is followed and result indicate that population density, population growth are the dominating factors of manufacturing firm formation for the period under concern for Turkey. Detailed results are reported in table 2.3

Table 2.3: Variable List and Outcomes (a)

Variable	Expectations	Panel Estimates
Growth GDP	+	**- (0)**
Growth Population	+	**+ (*)**
Population Density	+	**+ (**)**
Immigrant Share	+	**- (0)**
% University Graduates	+	**?**
% Technician Professionals	+	**+ (*)**
Unemployment Rate	?	**- (*)**
Δ *Unemployment Rate*	?	**+ (0)**
Average Firm Size	-	**- (0)**
% Entrepreneurs (SME)	+	**?**
Δ *Per Capita Deposits*	+	**- (0)**
Government Expenditures	+	**- (*)**

Source: Based on Gaygisiz and Koksal (2003)

(a) (0) represents insignificant estimate, (*) represents the significant estimates

Finally, more recently Gunalp and Cilasun (2006) following the debate of Geroski (1991) and Kaya and Ücdogruk (2002), for the period of 1993-1999 for 66 four digit manufacturing industries constructs a dynamic panel setting. The study instead of making a spatial observation, prefers to understand the dynamic process within different industries of manufacturing sector. Following the literature on industrial economists' remark on the firm birth process following variables are considered as the probable dynamics of firm formation; minimum efficient scale is calculated by the average plant size in the upper class of ranked plants, capital requirement is accounted for by computing the depreciation to average number of employees

ratio, advertising intensity is calculated by the ratio of total advertising expenditures relative to total industrial output, past profit rate is the difference between value added and payroll to total output at the previous period, industry growth rate is the percentage change in the industrial output, Herfindahl index is used to understand the concentration of industries. Moreover rental expenditures on machinery and equipment relative to depreciation, and the ratio of industry exports to industry output and finally real interest rate are used as additional variables of the process. Within the dynamic panel data context results underline that manufacturing industry firm formation is a follow up phenomenon; past entry rate is an important determinant of the current entry process. Moreover the concentration ratio is a negatively affecting determinant meaning that incumbents are vital obstacles for firm formation. Real interest rate is a significant negative determinant of the mechanism and finally ext rate seems to be a negligible factor of the process; deciding that firm formation I manufacturing industry in Turkey is not a replacement practice.

3. Regional Inequalities and Role of New Firms in Explaining Inequalities in Turkey

While the central question of the dissertation concentrates on a specific mechanism within the scope of regional business environment formation, it is still noteworthy to observe the background of the study area from a growth oriented perspective. As the central theme of the dissertation is not related with the regional growth and development of provinces in Turkey, discussion will not be carried out in a way that questions the roots of the difference between urban areas of Turkey, rather aims to illustrate the regional structure of income in Turkey by both reviewing the contemporary debate regarding the regional differences and also illustrating the regional income distribution for the post liberalization era in Turkey.

In this framework, this chapter first will introduce two different approaches toward the examination of regional income distribution in Turkey by differentiating the studies based on the assumptions regarding the spatial associations. Following a brief summary of this literature, historical developments in the regional policies in Turkey will be summarized as to give a broad overview of the policy implementations in the area of study. Finally the chapter will give an introduction overview of the income distribution in Turkey and try to link the regional income differences with new firm formation by also discussing the spatial associations and the neighborhood effects. Here major objective is to explain the importance of new firms in the

context of regional growth and development. Overall most important problem is regarding the inconsistency of the data sets; regional new firm start up number is available for 1997-2006, whereas per capita income data is available up to 2001. This inconsistency will be tried to be solved with the inclusion of per capita tax revenues of urban areas which is calculated for the period of 1997-2006.

3.1 A Review of the Regional Inequalities Discussion in Turkey

Examining regional dimensions of the income in Turkey takes the attention of numerous influential studies. Especially the post liberalization era of 1980 and the more recent developments realized by accessing to Custom Union in the mid of 1990s as well as the recent phase realized as an European Union candidate country are all important milestones for examining the impact of national developments on the distribution of regional income. Moreover keeping in mind the two major financial crises in 1994 and 2000-2001 as well as the Marmara District Earthquake in 1999, which heavily affected the manufacturing industry concentrated among the region, the post liberalization area's investigation regarding the distribution of regional income becomes more important. However as will be reviewed shortly and also as emphasized in the previous chapter lack of regional income data for the post 2001 crisis prevents many of the social scientists to evaluate the listed impacts' reflections on the post 2001 period in terms of distribution of regional income.

The literature regarding the investigation of income inequalities in Turkey is gathered around two separate approaches. In a traditional sense, a number of influential studies carry out

the debate by questioning the convergence phenomenon. However a more contemporary approach also evolves by adding a spatial dimension to the investigation of the relationship and observes the convergence issue by also dealing with the possible interaction between regions, urban areas.[22] Overall both set of studies give valuable information for the ongoing study as to shed light on the regional dimension of the social and economical environment in Turkey. Moreover they also provide important motivation to specifically divert the study to investigate the so called new firm formation mechanism in Turkey.

3.1.1 Contemporary Evidence for Regional Inequalities in Turkey

Among the prominent contributions of regional economists in Turkey, Atalik (1990, 2002) and Berber et al. (2000) remarks the lack of convergence among the provinces of Turkey.[23] Similarly Tansel et al. (1999) tries to account for regional disparities by concentrating on labor productivity. Findings indicate the polarization of labor productivity in Turkey; majority of the regions in Turkey have tendency to move away from the average labor productivity in Turkey based on the data of 1975-1999. While these studies put forward an understanding regarding the need for observing regional inequalities in Turkey, starting with a more illustrative but analytical framework is expected to be more informative. From this perspective Altinbas et al. (2002) is one of the first, but not the least, studies to investigate the regional differences in Turkey for the post liberalization era. The study deals with a number of issues to understand the path of regional inequalities in Turkey; per capita GDP, tax revenues, public expenditures, share of different

[22] A detailed representation regarding the methodological issues of spatial association will be carried out in chapter 6. This chapter and its sub sections will only review the findings of the spatial models without entering the roots of the debate regarding spatial interdependences.
[23] As cited by Gezici and Hewings (2004).

economic activities (manufacturing, agriculture and industry). Another important contribution of the study is related with the decomposition of the urban areas. Based on the Priority Development Areas (PDAs) a separation between provinces belonging to PDAs and outside PDAs are investigated for the period of 1987-1998.[24] In fact results remark the dual structure in the regional income inequalities in Turkey. Based on the sigma convergence, findings underline that urban areas belonging to PDAs forego increase in inequalities whereas urban areas outside the PDAs, which are relatively developed regions, realize a decline in the inequalities.[25] This structure is observed in all of the investigations based on different indicators preferred. Altinbas et al. (2002) explains these findings based on the accuracy of the selection of the PDA region urban areas, although the populist procedures are heavily criticized by the authors. Moreover final conclusions underline that policy implementations are mostly unsuccessful as the observed pattern of inequality is still rising in the area.

Meanwhile Dogruel and Dogruel (2003) is vital as to augment the previous remarks of Altinbas et al. (2002) towards the implementation of modern applications of convergence.[26] Dogruel and Dogruel (2003) augment the traditional beta convergence implementation of the literature. Based on the results of Altinbas et al. (2002) the importance of the path of various measures of convergence is taken into account and a dynamic approach is followed. A number of remarks are vital to assess the regional inequalities in Turkey. Over the entire urban areas results of the dynamic panel model underlines beta convergence; however Dogruel and Dogruel (2003) underlines that complementary observations regarding sigma convergence and also assessment of

[24] A brief overview of the Priority Development Areas (PDAs) will be carried out in sub section 3.1.3.
[25] Sigma convergence refers to the log of per capita income.
[26] See Barro and Sala-i Martin (1992), Barro and Sala-i Martin (1996), Lall and Yilmaz (2001) for implementations of convergence and recent augmentations to the constructed models.

the coefficient of variation gives profound understanding regarding the lack of convergence among the 67 urban areas of Turkey. Later Karaca (2004) forms a similar understanding to understand the path of regional inequalities remarking the absence of convergence both for the sigma case and also beta case.

In a more contemporary study Filiztekin (2009a) tries to evaluate regional inequalities from a number of different perspectives. Previous remarks of Filiztekin (1998) underline the absence of absolute convergence for the period of 1975-1995.[27] Originating from this fact and the common consensus in the literature regarding the lack of convergence in Turkey; Filiztekin (2009a) concentrates on the four major sources of regional disparities and a number of additional determinants. Major important difference and contribution of Filiztekin (2009a) is the reliance of labor market and human capital based determinants of the process; productivity, working population (dependency), labor force participation rate, employment creation and educational background of the regions in Turkey is evaluated. Assessment of the regions relative position in Turkey pinpoints that, while working population is increasing faster in the relatively less developed urban areas in Eastern and South East Anatolia, both labor force participation and also employment creation is lower in these areas. Filiztekin (2009a) remarks that, these negative developments prevent the usage of the opportunity realized by the high density of young population in the less developed regions of Turkey. Moreover regarding the productivity measures, findings remark the stable path of productivity for the sample period of 1980-2000. Overall Filiztekin (2009a) also adds that, in terms of education level (measured by the years of school enrollment) there is a fair improvement, however based on the higher education measures, findings indicate the concentration around the developed urban areas of Turkey in the west.

[27] As cited by Karaca (2004).

Finally regarding a number of other issues such as, per capita cinema, per capita non-governmental organizations (NGOs), per capita electricity consumption and per capita wastewater treatment, there exists a clear west-east distinction in Turkey.

3.1.2 Role of Geography for Understanding Regional Inequalities in Turkey

While the studies reviewed in the previous section and the remarks of Tansel et al (1999) are influential contemporary debates regarding regional inequalities in Turkey, a number of recent studies start to evaluate the same question by also injecting the effect of local association by constructing spatial observations. In the knowledge of this study it is first Gezici and Hewings (2002 and 2007) to demonstrate the spatial dependency of regional per capita income distribution for Turkey by following Exploratory Spatial Data Analysis (ESDA).[28] Major contribution of the understanding is regarding the injection of role of geography into the regional inequality debate in Turkey. First of all decomposition of the regional overall inequalities is an important implementation, in the sense that results give more room to investigate the roots of the lack of convergence evidence of the previous studies. Such a decomposition is evaluated by Gezici and Hewings (2002, 2007) by the so called Theil Index as to understand the between and within regional inequalities.[29] Results conclude that although overall inequalities are in the mood of declining, coming from the decrease in intra regional inequalities, inter regional inequalities are still increasing.[30] Moreover when the intra regional inequalities are observed, developed regions

[28] As noted through out the ongoing chapter, see chapter 6 for a detailed explanation of the possible ways to deal with spatial association.

[29] Gezici and Hewings (2002, 2007) uses three major classifications to observe within regional inequalities; geographical regions, functional regions based on 1982 classification in Turkey and finally coastal and non coastal region classification.

[30] For a detailed representation and implementations of Theil Index for Turkey, revisit Gezici and Hewings (2002, 2007) and Yildirim and Ocal (2006).

of the west contributes more with respect to the relatively less developed parts located on the east part of Turkey. Finally Gezici and Hewings (2002, 2007) try to observe an unsolved issue regarding the impact of neighbor provinces' development on each other. Two crucial findings are related with the level and growth level of GDP; while level of GDP realizes strong spatial association, for growth rate of GDP there is absence of significant spatial interdependence. In this formation, it is stated that developed urban areas of Turkey realizes higher spatial dependency, meaning that urban areas' impact on the neighbors are observed to be higher among the richer provinces of Turkey. Additionally regarding the local patterns it is underlined that two specific clusters are observed on the east and west part of Turkey, constituting of poor and rich urban areas respectively. In short, there exists a dual structure in the level of regional economic activity, with increasing dominance of spatial association among the richer urban areas in the west part of Turkey.

While ESDA type of observations is necessary to implement the impact of geography on regional inequalities, it seems to be insufficient as to have a more general understanding regarding the impact of spatial associations on regional growth (Anselin, 1993b, 1995). Gezici and Hewings (2004) originating from the neo classical economics debate regarding convergence, which is reviewed for Turkey above, includes the impact of neighbor urban areas' growth to understand the regional convergence. Actually such an approach is informative as it is one of the first attempts to add the role of geography into the regional inequality question in Turkey. Although Dogruel and Dogruel (2003) and Karaca (2004) control for the impact of locating in the east, they do not consider the combined effect of regional inequalities and spatial interactions. Preliminary findings of Gezici and Hewings (2004) remark that convergence is not the case for neither the provinces nor the functional areas of Turkey. Even when controlling for the income

and public investment of neighbor areas, still convergence can not be detected. However results remark that a relation runs from the neighbor's income and public investment towards the investigated areas' income. While spatial econometric models are not preferred, results based on the investigation of ESDA, determines a set of clusters. Clusters composed of lagging and developing urban centers in the east and highly growing metropolitan areas in the west give a general descriptive illustration. Moreover periodical spatial data analyses also validates that this clustering pattern is persistent from 1987 to 1997. Furthermore when the specific urban centers belonging to Priority Development Areas (PDAs) are investigated, findings locate these urban areas in the cluster composed lagging urban areas of Turkey. Overall while Gezici and Hewings (2004) continue to support the previous empirical evidence against the neo liberal expectations of convergence in Turkey, they contribute to the regional inequality debate in Turkey by focusing on the impact of neighbor areas' income.

Inspired by the remarks of Gezici and Hewings (2002, 2004, 2007), it is Yildirim and Ocal (2006) to first construct a spatial convergence model and question the impact of spatiality on the regional income inequalities. Preliminary observations aim to decompose the regional inequalities measured by the Theil index. The unit of observation is NUTS 3 and the regions are grouped under four categories; (i) Marmara, (ii) Aegean, Mediterranean, West Anatolia, (iii) Eastern and South East Anatolia, (iv) Black sea and Middle Anatolia. Results underline that while between regional inequalities are increasing, within regional inequalities are observed to diminish. Based on these observations Yildirim and Ocal (2006) also pinpoints that income inequalities have a procyclical nature, which can be observed with the long time span of the study running from 1974 to 2001. Second set of observations of Yildirim and Ocal (2006) improves both Dogruel and Dogruel (2003), Karaca (2004) as well as Gezici and Hewings (2004) and

questions the beta convergence by comparing the non spatial dependent OLS type of observations with the spatially dependent models such as Spatial Auto Regressive (SAR) and Spatial Error Models (SEM), which will be mentioned in chapter 6 once more. In short SAR assumes that spatial interactions work over the neighbors' realization of the dependent variable, whereas SEM proposes that spatial interaction is captured by the error meaning that any random shock will have identical impacts on the spatial units of observations. Overall Yildirim and Ocal (2006) summarizes that there is a sign of convergence for the models in which spatial associations are taken into account. These findings are vital in the sense that will place the study in a unique place commenting on the possible convergence of urban areas in Turkey. While Dogruel and Dogruel (2003) also reaches some preliminary findings regarding beta convergence in their non-spatial models, they concentrate their final conclusions towards the persistence of regional income inequalities based on a number of different models and also based on the findings regarding coefficient of variation and sigma convergence measures for the period under concern.

Finally Aldan and Gaygisiz (2006) evaluates the regional inequalities in a similar fashion with Yildirim and Ocal (2006) with augmentation of the Markov Chain observations similar to Tansel et al. (1999).[31] Both traditional (as called by the authors) convergence approach and also distribution dynamics approach are followed. Regarding the convergence of 67 provinces of Turkey, both non spatial OLS cross section estimates as well as the spatial dependent cross section models underline the lack of convergence for the sample period. However what Aldan and Gaygisiz (2006) repeats is related with the existence of spatial

[31] For application of Markov Chain implementations fore understanding regional inequalities and spatial interrelations, see Tansel et al. (1999), Le Gallo (2004) and Aldan and Gaygisiz (2006).

dependence among the urban areas of Turkey. These results are also confronted by the distribution dynamics approach.

3.1.3 Discussing Regional Policy Implementations in Turkey

These growing discussions underline the continuing disparities among the urban areas in Turkey. While Yildirim and Ocal (2006) mention about the possible convergence in their spatially dependent model, at the end overall consensus of the literature is on the persistence of the gap between west and east in Turkey, regarding the various social and economical measures. In this respect revisiting the policy side of the debate and mentioning the various aspects of regional policies in Turkey should be informative as to check for the validity of the tools and success of the implementations.[32]

As debated by Dogruel (2006) and Filiztekin (2009a), rise of the regional policy implementations in Turkey can be witnessed for the post 1960 period, which represents the Planned Development Era of the Turkish Republic. Regarding the pre 1960 period, both Bayramoglu (2005) and also Dogruel (2006) remarks the lack of policy concerns at the regional level. Bayramoglu (2005) mentions the centralist attitude of the period and names a number of few local implementations of Turkey. During the period of 1927-1947 a number of local administrative offices called "Umimi Mufettislikler" were formed, however they all are far away from being local units dealing with the social and economical concerns of the regions, rather act as bodies dealing with local security and administrative issues. In this respect it will be

[32] A brief overview of the development plans and the major criticisms over these plans can be observed in this section. For the details of the overall plans and the articles of the development plans regarding regional policies see http://www.dpt.gov.tr/DPT.portal

meaningful to emphasize the lack of political concern towards the regional differences due to major national concerns. As discussed by Dogruel (2006) the firs era of the republican period mainly works on the industrialization of the economy and construction of a sound infrastructure, knowing the post war period and the foundation period of Turkey such an approach and developments are found to be consistent.

From this point of view, start of the planned development era for the post 1960 period and development plans' implications are both important to assess the policy implementations at the regional level in Turkey. From the first development plan of 1963-1967 to the most recent plan, a special place is give to regional inequalities and various tools to work against disparities. In this manner first development plan aims to determine the lagging regions of Turkey and introduces a general objective to implement policies that will decrease the gap between developed and lagging regions of the country. Three major groups are formed; metropolitan areas, lagging regions and potential development areas. In this view Eastern and South East Anatolia is regarded as a lagging region, Antalya is assessed as a potential development area, East Marmara is given special emphasis to distribute the high concentration on the metropolitan areas of Marmara and finally Zonguldak is pointed out as an important industry location.

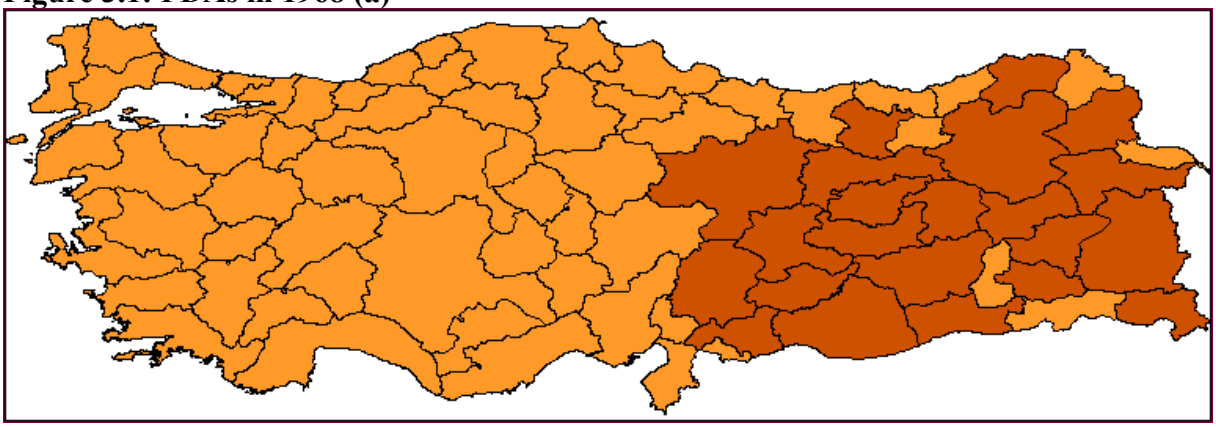
Following the first plan, with the second development plan (1968-1972), tools and specific implementations started to evolve. Place of public to complement the private sector is underlined. A special remark is given to urbanization as an important push effect for the economy. Expectations and remarks are mostly related with the (unexplained) job creation and employment absorption capacities of urban areas, in line with both national and also regional development concerns. Overall most important remark of the program was the aim to determine

strategic urban areas for lagging regions of Turkey as an origin for those areas to catch up the rest of the country. Meanwhile specific tools to promote private sector by incentives, tax reductions, cheap energy usage and credit sources are also listed.

While these two plans are crucial in terms of regional policy making, it turns out that the construction of the Priority Development Areas (PDA) formally during the third development plan (1973-1977) is one of the most important building blocks of the regional development struggles of Turkey, which is still in effect and will be evaluated through out the remaining part of the debate.[33] In this perspective it is important from the point of view of the policy side that not only the economical conditions of these determined regions are concerned but also their lagging social, cultural and also human capital bases are debated. In this view the regions demonstrated in figure 3.1 represents the first set of 22 regions that are regarded as PDAs in Turkey in 1968, which is later increased to 40 urban areas in 1973. The third plan aims to investigate these PDAs and try to list the potential natural resources and economic activities of these regions and further development agendas was expected to be constructed over these evaluations.

[33] As discussed by Dogruel (2006) the determination of regions which needs special treatment in terms of development concerns is already started in the previous period. During the second development period 22 urban areas are determined as less developed urban areas and in 1971 a special body under the State Planning Organization (SPO) was founded as PDA Administration office (Dogruel, 2006: 174).

Figure 3.1: PDAs in 1968 (a)



Source: SPO
(a)Darker (brown) provinces represent the PDAs in 1968.

The fourth plan (1979-1983) while follows the previous implementations of PDAs, more importantly mentions the spatial distribution of industrial production and detects the heavy concentration of the production around the Marmara district. Coming to 20 years of planning and regional policy constructions struggles, comments of the policy making underlines the insufficiency of the previous attempts to decrease the gap between developed and less developed regions of Turkey. Increasing share of manufacturing production around Marmara and Aegean Region and decreasing share in the East and South East Anatolia is mainly associated with the lagging institutional infrastructure as well as the lack of organization and coordination at the regional level. Despite the previous aims and remarks of the plans, high share of households and decreasing share of income (in total economy) still exits in the less developed areas of East and South East Anatolia. Two points are worth mentioning for the fourth plan; direct criticism over the insufficiency of the measures taken and investigation of production by taking into account into the importance of space (a spatial perspective).

Originating from these discussions and criticisms, constructed fifth plan (1985-1989) tries to combine the regional and industrial (sector specific) relationships together. Meanwhile two important institutional developments should be remarked regarding Region Development Schemes and Project Offices. Especially for the location choice of Organized Industry Districts, usage of Region Development Schemes is advised. Moreover policies regarding the promotion of Small and Medium Enterprises (SME) are handled based on the ongoing PDA implementations. Meanwhile to decrease the increasing burden on the metropolitan areas two policies are recommended; formation of sub regions around metropolitan areas, and increasing the employment opportunities in the lagging less developed urban areas (or sub regions around metropolitans) to prevent rising migration towards urban centers. While it is expected to be discussed in the following section, a clear policy implementation to satisfy these goals is not mentioned.

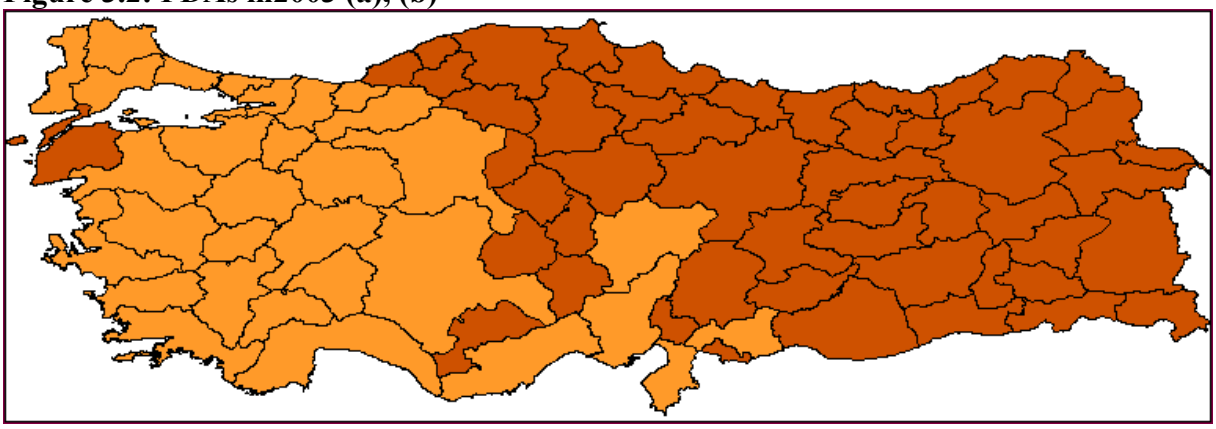
After 1990s, development plans continue to name the regional disparity phenomenon by revisiting PDA implementations and various tools of the past period. During the sixth development plan (1990-1994) a specific remark was done for the problem of increasing urbanization. Unlike the previous plans, urbanization and its consequences are discussed by the realized side effects in the metropolitan areas, especially in the west. Employment creation in the less developed areas can not be sustained but more importantly increasing migration from these areas towards the metropolitan areas can not be matched by increasing the employment opportunities in the developed urban areas. Actually this has two consequences; increasing gap between the less developed areas and the relatively developed metropolitan areas as well as increasing within inequalities in the metropolitan areas. Moreover other than the unhealthy

developments in urbanization, formation of sub regions to decrease the weight over metropolitan areas can not be handled as expected.

Starting from the mid of 1990, development plans start to mention the importance of policy implementations at the local level. Remarks regarding the lack of local policy implementations are pointed out as an important determinant of the ongoing regional disparities. Seventh development plan (1996-2000) also underlines the long lasting terror fact in the East and South East Anatolia as an important factor behind the lagging property of the region. In addition to that regarding the side effects of urbanization, failure to integrate the migrated people to urban life is also another dimension of the regional disparity problems from a social and economical point of view. This view is later revisited in the eight development plan (2001-2005). The trend towards the centralization of finance and related services in the metropolitan areas and the shift of production to peripheral areas is mentioned separately. Actually, these developments and the sub region development implementation mentioned in the previous plans are consistent, however results underline that such a development can not observed country wide. While share of manufacturing production in urban areas of the west, such as Istanbul, Izmir, Ankara, are decreasing and services shares are increasing, still value added share disparities moreover regional social and economical development index values' disparities persists in Turkey. Note that in this perspective both the eight development plan (2001-2005) and also the ninth development plan (2007-2013) underlines the need to offer policies and solutions at the local level. Here it is worth mentioning that European Union membership plays an important role in the regional policy making; hence the ninth development plan underlines the need for developed central and local offices that directly aims to manage the future possible funds coming from the

full membership to the union. This is actually an institutional move for satisfying the one of the various prerequisites of the union.

Figure 3.2: PDAs in2003 (a), (b)



Source: SPO
(a)For Canakkale only the sub regions of Bozcaada and Gokceaada are accounted as PDAs.
(b)Darker (brown) provinces represent the PDAs in 1968.

Overall starting from 1960s to 2010, implementations towards decreasing regional disparities always find its place in the five year development plans. While numerous objectives and tools are mentioned in the plans, regarding the implementations of these plans and the policy making process can be found to be unclear. Reflections of these conflicts in the plans can be observed by the realizations (Altinbas, 2002, Dogruel, 2006 and Filiztekin, 2009a). In the view of the ongoing study, comparison of figures 3.1 and 3.2 is informative as to understand the spreading out of the PDAs. It is expected that comparison of these figures with the major social and economical conditions of the regions will yield valuable information about the regional inequalities. From this perspective next section will give an illustrative information about the regional income distribution as to help one to discuss the sufficiency of the so for debated

regional policy implementations. Moreover it will give a profound understanding about the link between regional inequalities and regional new firm formation. Hence following section will explain the one of the, but not the least expected contribution of the dissertation as a whole to the regional science and regional inequality discussion in Turkey, by emphasizing the distribution of regional economic activity for the post 2001 period.

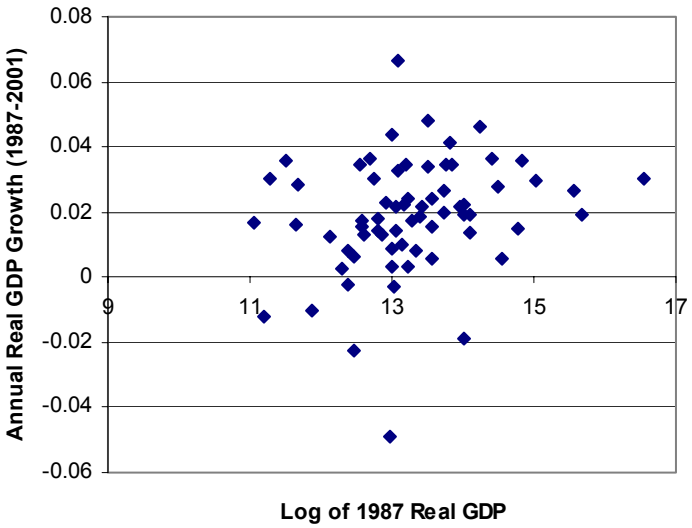
3.2 Regional Income Distribution and Firm Formation in Turkey

Previous section of the chapter has already reviewed the central literature underlining the lack of regional income convergence in Turkey. Major remark is regarding the insufficiency of policy implications to close the gap between east and west regions of Turkey. Among these discussions Dogruel and Dogruel (2003), Dogruel (2006) underlines the unsuccessful regional policy implementations, Filiztekin (2009a) emphasizes that whether they are managed properly or not at the end regional policy tools and implementations are unsustainable.

In line with these discussions, before proceeding to the investigation of the link between regional income distribution and regional firm formation, a very brief overview of the regional distribution of income both historically and also spatially can be informative. In this sense 1987 is regarded as the initial year and the annual real growth performances of urban areas in Turkey are considered. Figure 3.3 and Figure 3.4 summarizes the relationship between initial income levels (both overall and also per capita) with the annual average growth rates. In case urban areas with low income levels in 1987 realizes higher average growth rate for the period, then there will

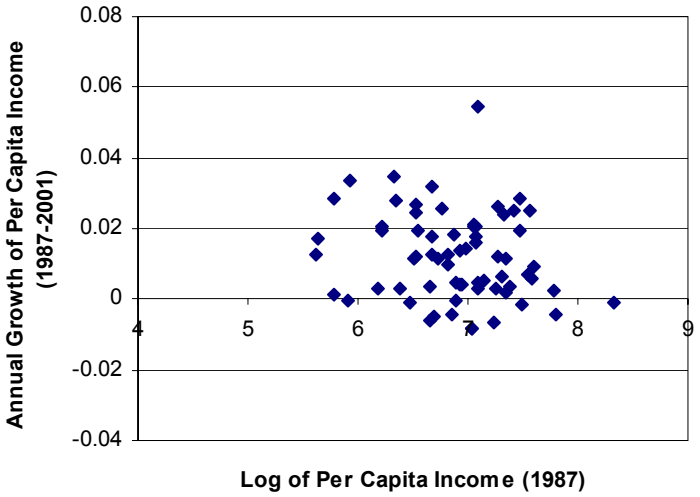
be room to discuss the convergence of the regions. However both illustrations here remark that this is not the case for urban areas of Turkey.

Figure 3.3: Regional GDP Growth and Initial Conditions (1987 prices)



Source: TURKSTAT, author's own calculations

Figure 3.4: Regional Per Capita GDP Growth and Initial Conditions (1987 prices)



Source: TURKSTAT, author's own calculations

While these illustrations give a general insight about the persistence of the so called gap between regions of Turkey, as a complementary observation, sigma convergence and coefficient of variation are also computed as to broaden the convergence discussion. Sigma convergence is computed by calculating the cross section standard deviation of the log of regional per capita GDP. Similarly coefficient of variation is computed by dividing the cross section standard deviation with the cross section means for each year. Overall despite the decline in 2001 illustrations in figures 3.5 and 3.6 remark the increasing variation in cross section regional income in Turkey, validating the previous remarks of Dogruel and Dogruel (2003), Karaca (2004), Gezici and Hewings (2004). However note that 2001 represents one of the worst financial turmoil of Republican Era and it is expected that regional income distribution will also be affected from the 2001 crisis. Moreover macroeconomic overview of the 2001 underlines

structural breaks at the national level for post 2001 period, so it seems to be a necessity to carry the regional inequality discussion towards the post 2001 period.

Figure 3.5: Coefficient of Variation of Per Capita GDP

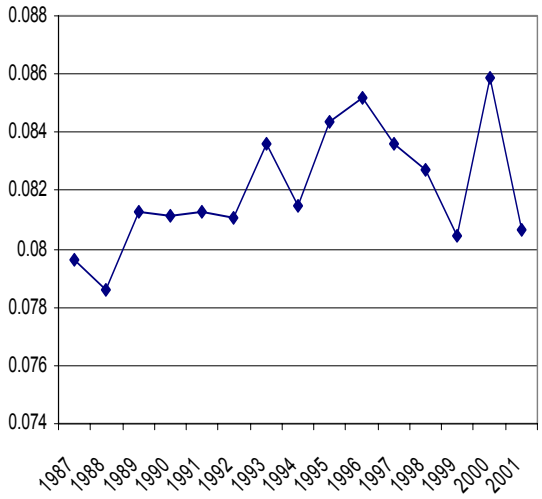
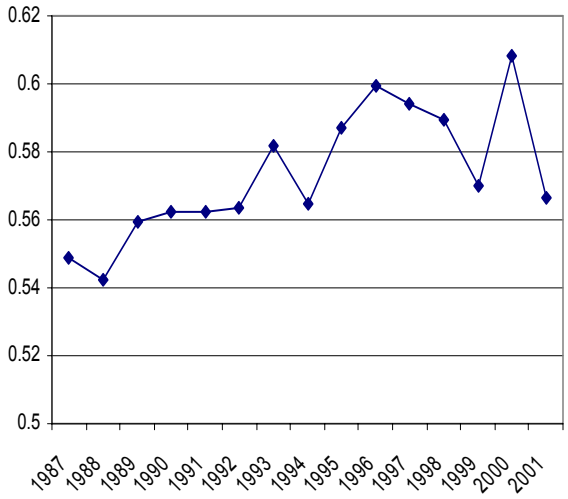


Figure 3.6: Sigma Convergence of Per Capita GDP

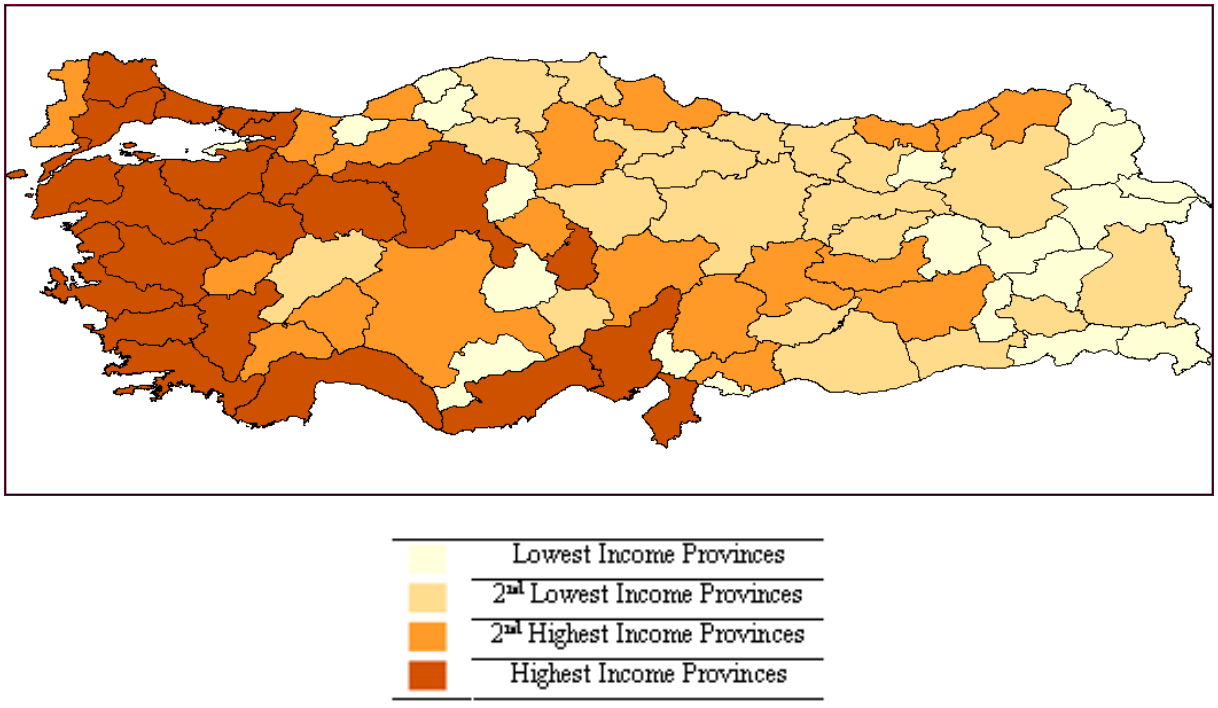


Source: TURKSTAT, author's own calculations

These representations give an overview about the inequalities in Turkey from a historical perspective. However, examining the spatial distribution of these inequalities is expected to yield a number of additional information regarding the clustering (or agglomeration) behavior of local income (or wealth) in Turkey. In this respect dividing the regional per capita incomes into 4 quartiles figures 3.7 and 3.8 compares the distribution of per capita income in Turkey in 1987 and 2001 respectively, with the darker areas with higher per capita income. Figures indicate that relatively rich urban areas concentrated in the Marmara Region, Aegean

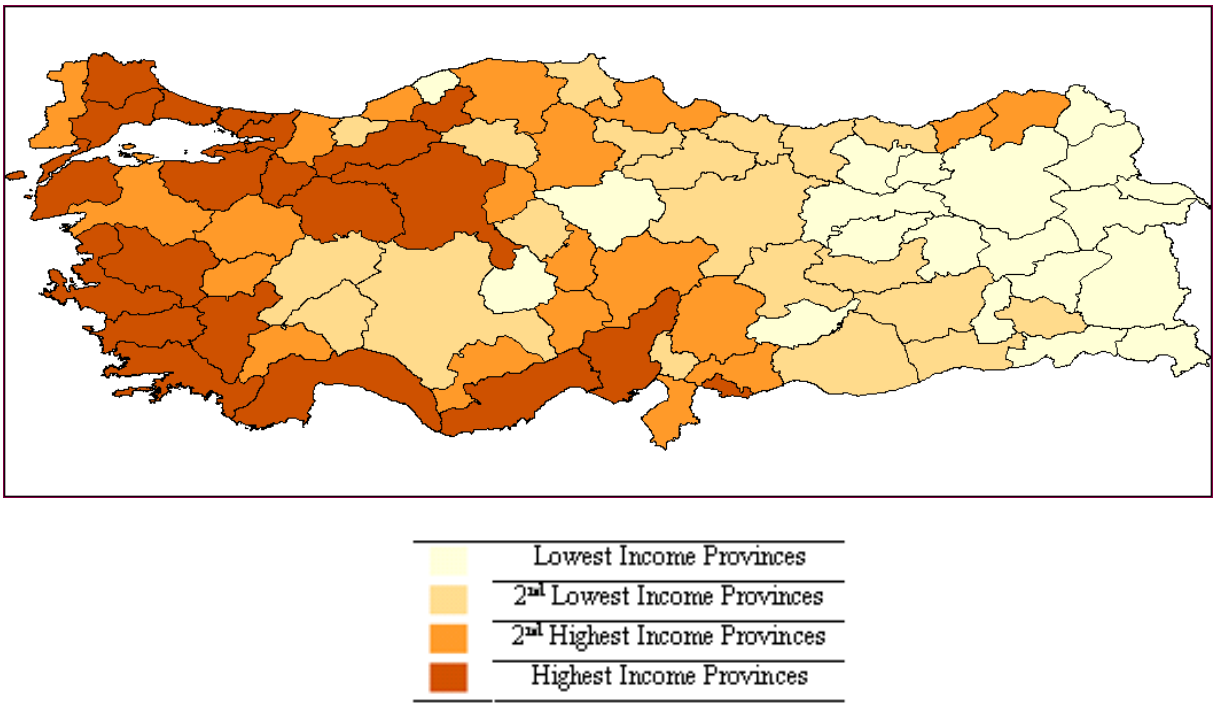
Region and South Costal Regions of Turkey, whereas Eastern, South East Anatolia and Middle and East Blacksea Regions represents the lagging less developed urban areas of Turkey. It is here noteworthy to remark that, while the general structure regarding the persistence of the gap between west and south still exists, there is a limited collapse in the developed regions in the west as of year 2001. A number of urban areas left the so called rich area cluster based on 2001 data. Keeping in mind the possible lagged impacts of the 2001 crisis, observing the post 2001 period in terms of regional income distribution would give us important information about the distinct impacts of the financial crisis in Turkey.

Figure 3.7: Spatial Distribution of Per capita Income (1987)



Source; TURKSTAT

Figure 3.8: Spatial Distribution of Per Capita Income (2001)



Source: TURKSTAT

In line with the desire to capture the regional income distribution pattern for the post 2001 period, a proxy is tried to be used. Keeping in mind the major limitations per capita tax revenues of urban areas are plotted.[34] Such an approach is already offered by Altinbas et al. (2002), Dogruel and Dogruel (2003). In this manner, to check for the reliability of the tax revenues as proxy for regional income, first regional per capita income and regional per capita tax revenues should be compared. After capturing the validity of the proxy, next tax revenues can be compared with the firm formation numbers both for the pre and also for the post 2001 period.

[34] A detailed discussion regarding the possible problems of using tax revenues as an indicator of regional income is left to chapter 4 and 5.

Figures 3.9 and 3.10 can be compared with figures 3.11 and 3.12 to see the spatial distribution of per capita income and tax revenues for years 1996 and 2001 respectively. Results indicate that per capita tax collection seems to be a good indicator to asses the distribution of per capita income for the post 2001 period. In this sense, findings are important contributions as to shed some light over the regional prosperity distribution in Turkey for the post 2001 financial crisis period.

Figure 3.9: Per Capita Income 1997

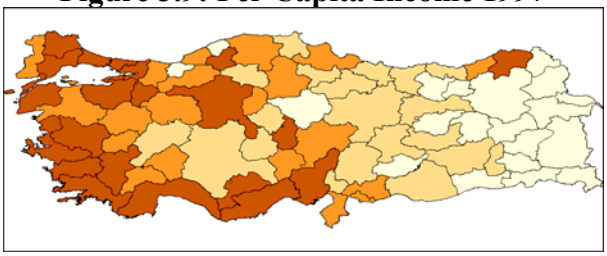


Figure 3.10: Per Capita Income 2001

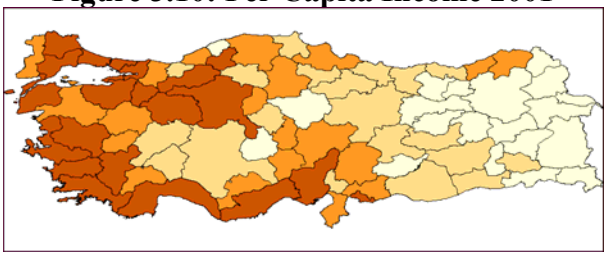


Figure 3.11: Per Capita Tax Revenues 1997

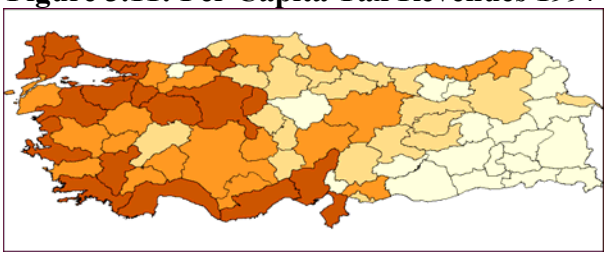
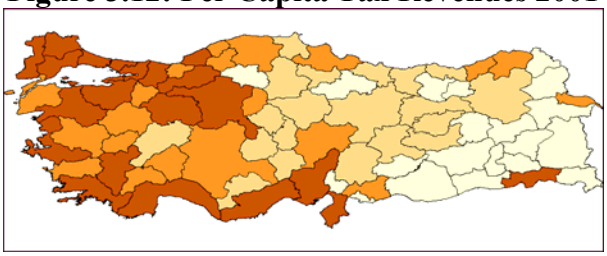
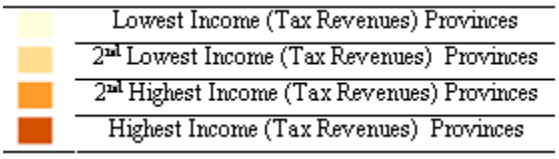


Figure 3.12: Per Capita Tax Revenues 2001



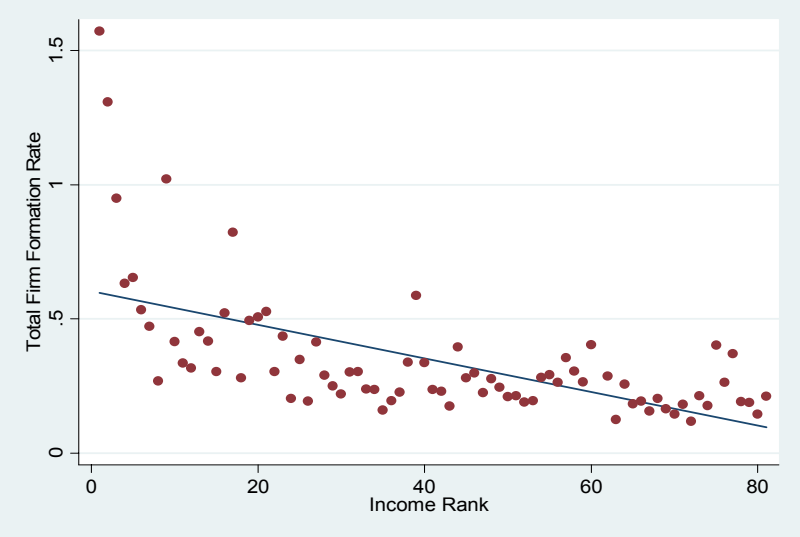


Sources: TURKSTAT, author's own calculation

Originating from these remarks, remaining part of this section will be devoted to carry out the discussion towards the evaluation of the relationship between regional development and regional firm formation. As per capita tax revenues are found to be informative to evaluate the development of regions' income levels, a number of comparisons among them and the regional firm formation (gross numbers) will be evaluated. Revisiting the discussion constructed in chapter 2, regarding the place of new firms in the economic development and growth, different approaches can be constructed. Whether it is the job creation capacities of new firms (Storey, 1994) or the knowledge commercialization power of entrepreneurs (what the study regards as the new firms) (Acs et al. 2003), it will not matter; rather what is in the center of the discussion is whether regions with relatively high firm formation realizations are also performing well in terms of regional prosperity and development. Note that the causality is not an issue here, it has already been stated that the models that will be introduced in chapter 4 and constructed in chapter 5 aims to direct the relation running from the regional social and economical properties of regions towards the new firm formation, thus location choice of production.

In this respect figure 3.13 plots the relationship between total firm formation and the regional income rank based on 2001 data. Results validates that regions that rank in the better part of the ranking are the ones realizing higher firm formation. Moreover figures 3.14, 3.15 and 3.16 give a specific comparison between sectoral firm formation and regional per capita tax collections for the period of 1997-2006.

Figure 3.13: Regional Income Ranking and Regional Total Firm Formation

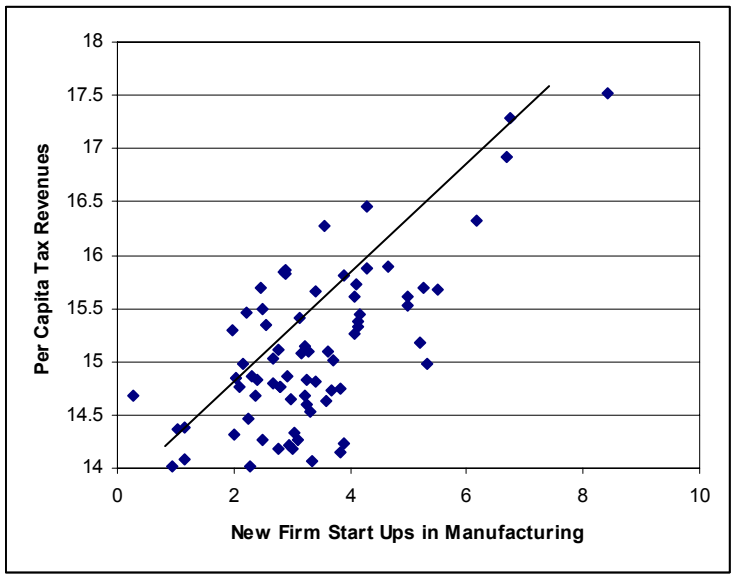


Source: TURKSTAT, author's own calculations

While figure 3.13 gives a general illustration of the pre 2001 period, observing a more contemporary period will be informative. As discussed above in order to asses the post 2001 period, per capita tax revenues are regarded as a proper proxy for regional income values. Keeping in mind the side effects of using tax revenues to discuss regional prosperity, number of firms that are regarded as start ups for that period are related with the regional tax revenues. For this understanding, following three figures are plotted; all indicating the positive association with regional prosperity and the number of new firms for the related economic activity. Here it's worth mentioning once more that, causality is not the issue here. While theoretical debates and also empirical evidence validates the positive impact of new firms for regional prosperity, it is also an important building block in the NEG that regional prosperity is also an important determinant affecting location choice of new firms. Besides as it will be debated in the chapter 4 and will be tested in chapter 5 regional prosperity will be regarded as an important demand side

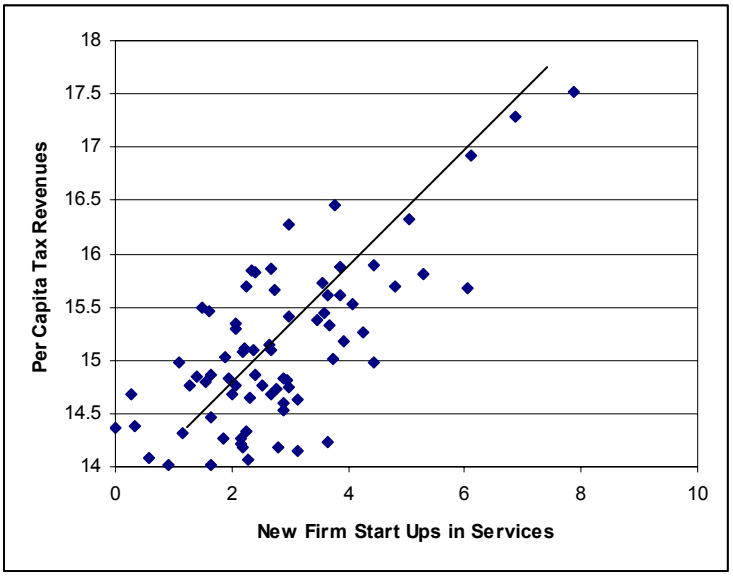
determinant. Hence discussion here aims to just revisit the interconnection between new firms and regional prosperity that somehow validates the central concern of investigating the economic activity.

Figure 3.14: Regional Manufacturing New Firm Formation and Regional Prosperity (1997-2006 Averages)



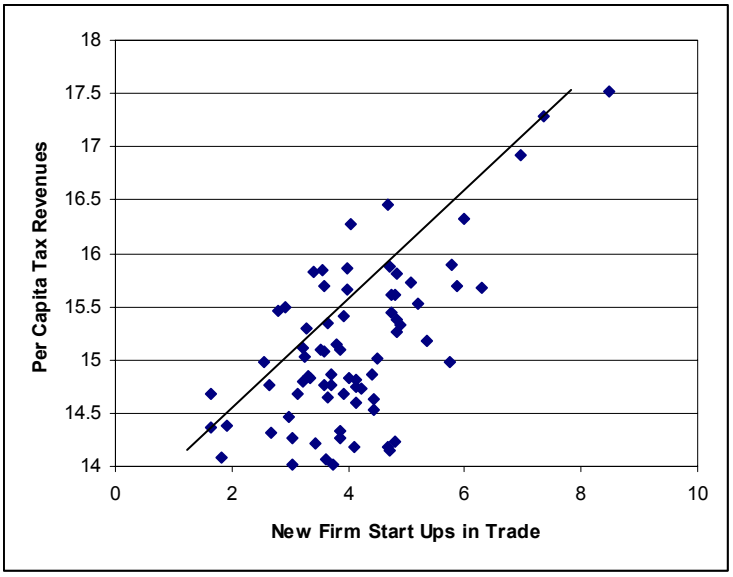
Source: TURKSTAT, author's own calculations

Figure 3.15: Regional Services New Firm Formation and Regional Prosperity (1997-2006 Averages)



Source: TURKSTAT, author's own calculations

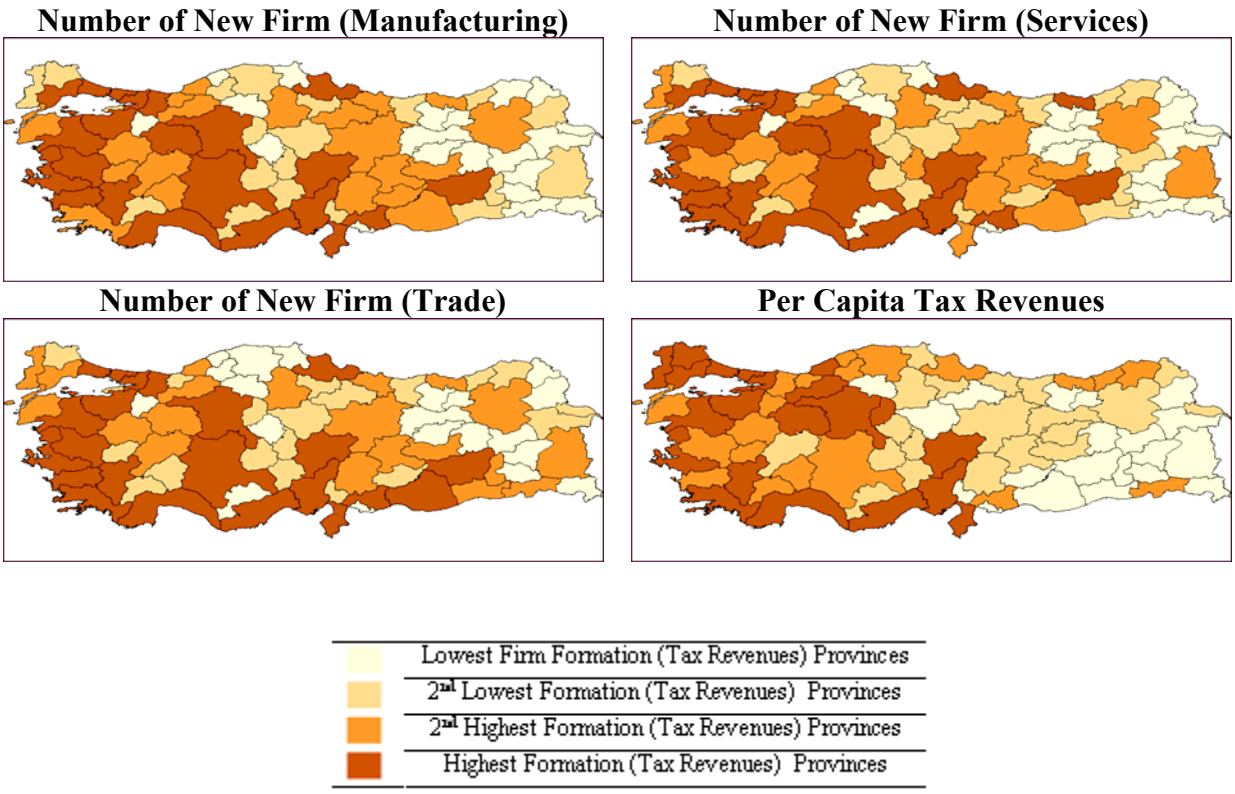
Figure 3.16: Regional Trade New Firm Formation and Regional Prosperity (1997-2006 Averages)



Source: TURKSTAT, author's own calculations

Finally combined maps illustrated in figure 3.17 give an overall view of the spatial distribution of newly formed firms in three major economic activities in Turkey and compare it with the per capita tax revenues for the period of 1997-2006.[35] Illustrations here explain the similar patterns between firm formations and regional prosperity, validating the inevitable role of new firm formation process for regional growth and development.

Figure 3.17: Spatial Distribution of New Firms and Regional Prosperity (1997-2006)



Source: TURKSTAT, author's own calculations

[35] While these preliminary illustrations are illustrative, they are still at introduction level. To have a deeper understanding one can visit chapter 6 and follow the discussion regarding the geographic proximity of regions and regional prosperity distribution. While regional income proxy still manages to explain a sound amount of the spatial variation and distribution of new firm formations, incorporating the market potentials of regions and then trying to illustrate a similar construction will be informative and left for chapter 6.

4. Distribution and Dynamics of New Firm Start Ups from a Non-Spatial Perspective

Based on the constructed theoretical framework the remaining part of the dissertation is devoted to the investigation of the distribution and also dynamics of new firm start ups in Turkey. While chapter 3 aims to give a profound understanding regarding the regional economic conditions in Turkey, it is actually chapter 5 to describe the regional distribution of new firm start ups. Moreover the models will give a clear understanding about the major determinants of the process by concentrating on the regional social and economical properties of Turkey. In a descriptive manner the illustration regarding new firm start ups in Turkey will be constructed however, expectations regarding the contribution of the study to regional science and new economic geography can actually be best observed with the help of empirical analysis. While the research hypothesis tries to distinguish numerous factors of entrepreneurial behavior by using new firm start ups, observer needs to be aware of the fact that, data availability is a major constraint of the empirical part of the study. However, it will be a crucial oversight for a social scientist to forego asking specific questions just due to data availabilities.

For this purpose this chapter will first list the research questions by explaining the related data sets and next explain the relevant methodological framework to answer the central questions of the dissertation. However while the framework introduced here will stood at the

center of the whole study, it will not include the approaches and analyses regarding the assessment of spatial interactions and role of geography, which are both left to chapter 6. In line with these concerns, ongoing chapter of the study will draw the borders of the empirical observations that will be carried out in chapter 5.

4.1 Hypothesis and Related Data Set

The core discussion of the dissertation is to understand the new firm start ups' location choice behavior in Turkey, by combining the time series property of the question with the cross section dimension. Here it is obvious that panel data methodology is applicable however strictly subject to data availabilities. In this manner different panel data models will be built up for Turkey at the Nomenclature of Territorial Units for Statistics 3 level (NUTS 3). The urban areas under concern will be evaluated for a short time period of 1997-2006. Due to lack of data Düzce is removed from the sample. For the remaining 80 cross sections of Turkey for a 10 year period, the introduced model will be a balanced micro panel with time dimension significantly lower than the cross section (Baltagi, 2005: 8). Note that the sample period under concern, while can be criticized due to its short time dimension relative to the cross section dimension, it still contains valuable information. First of all the sample period just follows the 1994 crisis, thus expected to contain the information regarding the lagged effects of the crisis on the business environment. Moreover the sample period also contains the 2001 crisis representing the one of the major financial distress of the post 1980 liberalization and even the republican period in Turkey. In short, the sample period both contains the immediate and also lagged effects of 2001 crisis.

As to account for the dispersion and the factors of regional new firm start up behavior of Turkey, firm birth numbers are collected as the endogenous variable of all models. The data is obtained at NUTS 3 level for NACE 1.1 classification.[36] Due to the fact that, working for the entire sub sectors of the classification may prevent the central question of the dissertation to be left unanswered, three major economic activities are selected; manufacturing, trade and services.[37] Choosing three major industries helps the study to concentrate on three set of models that will be constructed for each of the pairs separately.

While these newly formed firm numbers help individuals to concentrate on the exact economic activity of the regions, it also cancels out the possible adverse effects of observing net firm formation numbers; which actually is just the difference between new firm start ups and closers. The fact is that choosing the net firm numbers will also add the determinants behind the firm closers of regions, which is outside the scope of the ongoing study. Originating from the central objective, before discussing the regional control variables special emphasis should be given to the standardization of the new firm start up numbers. Evans and Jovanovic (1989) remark the importance of standardization of firm formation and even firm closers number. Two major approaches are advised. (i) Ecological Approach (EA), prefers to standardize the firm formation with the number of firms already located in that region**,** (ii) Labor Market Approach (LMA), advices to use the actively working labor force of the region. However due to the fact that both data sets are not available at NUTS 3 level for Turkey, a third approach is constructed for the standardization issue. Rather than using the labor force, the models throughout the study

[36] Data is obtained from Turkish Statistics Office (TURKSTAT). Data covers only the registered firm starts ups for the period of 1997-2006.

[37] Based on the given classification of NACE 1.1, manufacturing and trade industries are collected directly from the data set. For servicing activities following industries are agglomerated under the major title of services; financial services, various tourism services, renting and other services.

prefer to use the population level as the standardization tool. Such an understanding causes the dependent variable of the model become a per capita indicator.

In line with the central theme of the dissertation research questions are aggregated under three major topics and three sets of social and economic indicators are gathered; demand side, supply side and policy side.[38]

First of all to question the demand pulling hypothesis of Krugman (1991a, b, c), a demand side indicator is tried to be preferred. It is expected that increasing demand in any form will stimulate new firm formation; areas with increasing demand potential should be attracting new firms and should have impact on the location choice of new firms. A number of demand side variables are considered following the empirical literature; population level, density, growth as well as income levels. However due to the fact that dependent variable uses population measure as the standardization unit, population and density figures are removed from the empirical part of the analysis. While population (level and growth) measures are commonly used, it is more convenient to use income levels and/or growth to understand the impact on new firms' location choice. Thus in addition to those variables per capita real income is tried to be introduced to the model. However due to the fact that, per capita income at NUTS 3 level is only available up to 2001 in Turkey, it is not applicable for the constructed panel model. To control for the income levels of urban areas a proxy is introduced; per capita real tax revenues of urban areas. In the scope of the ongoing understanding, provinces reporting high tax revenues should somehow be the ones with high income thus demand potential. One can also judge the proxy as a sign of

[38] Data is obtained from the various sources of Turkey such as; Turkish Banking Association (TBA), Turkish Statistics Office (TURKSTAT), Central Bank of Republic of Turkey (CBRT), Ministry of Finance of Turkey (MOF).

economic activity; in any case using tax values as a demand side indicator is expected to be informative.[39]

Secondly to understand the supply side of the relationship emphasis is given to physical and non-physical capital comparison as well as industrial linkages. While expectations regarding the impact of human capital on new firms' choice are straight forward, in favor of a positive association, expectations regarding the liberalization and deepening of financial markets is contradictory and will be discussed shortly. Moreover inter industrial effects are evaluated first on the grounds of Venables (1996), however possible critiques and possible reverse effects are tried to be illustrated.

For human capital development's effect, Marshalian (1920) hypothesis of labor market pooling is investigated by two different measures of education. Actually in the understanding of the labor market pooling hypothesis using student numbers is expected to be positively associated with the new firm start ups, due to the fact that students should represent a potential labor force base, which means less time spend by the firms to hire people. To do so student number in secondary and university education relative to the regional population is used. Moreover, as to widen the debate an education quality indicator is introduced. Lecturer over student in higher education is computed to account for the quality in the higher education. It is expected that rising quality of the human capital base is also a complementary effect on the labor market pooling hypothesis.

[39] A detailed discussion about using tax revenues as an income proxy is carried out through chapters 3 and 5.

Next to evaluate the impact of financial capital developments, two different discussions are considered. Following the concerns of Evans and Jovanovic (1989), Emran and Stiglitz (2007), financial capital availability and the financial deepening of regions are tried to be evaluated by using per capita real deposit and credit volumes. It is well known from the economic growth literature that McKinnon and Shaw (1973) hypothesis and more contemporary followers of Bencivenga and Smith (1991) and Bencivenga et al. (1996) all favor increasing financial deepening by emphasizing its positive impact on money and capital markets. While this understanding is evaluated at the national level, investigation can also be carried out at the regional level. However such observations are most of the time subject to the conflict between national and regional financial systems. Through these discussions while O'Brien (1991) underlines that economic geography of finance does not matter for localities; Best (1990) and Tickell (2003) underline that finance especially in the form of a local bank based development, has many remarks about industrial development. Especially Tickell (2003) remarks that other than the direct effect of finance on localities, through creation of financial jobs, financial development represents a more vital indirect function which sustains a more efficient and competitive environment for well working of the credit channels. Meanwhile Alessandrini and Zazzaro (1999) mentions that a local -regional- bank based system will decrease the informational asymmetries that will reduce the direct and indirect costs of entering the credit channel for small and medium enterprises. Here a related notation belongs to Bowles (1998); comparing a regionally developed banking system and a centralized banking system; points out the efficiency gains realized by forming regional banking systems which have higher accumulated knowledge regarding the local properties of production and employment. Inspired by these remarks and also more historical and influential ideas of Schumpeter (1912), Evans and Jovanovic (1989) carries out the discussion towards entrepreneurs. Due to liquidity constraints

entrepreneurs should be financed based on the Schumpeterian (1912) expectation of the innovation and creativity of new firms. However on a contrary view more recently Emran and Stiglitz (2007), debated that increasing liberalization in financial markets may harm new firms; due to their increasing default probability thus risk potential, which may be combined with the short termist behavior of the banking system and increasing regulatory framework of the overall system. Inspired by these discussion, expected impact of the financial deepening on new firms' location choice is found to be contradictory. Moreover due to the fact that a national banking system exists in Turkey, results should also be taken into account carefully.[40] In line with this discussion per capita deposit and credit volumes are used to account for the impact of regional financial development on the new firm formation potential of provinces.

Final consideration regarding the supply side of the relationship comes from the possible industrial linkages. This discussion regarding the possible positive effect of different industries on each other is considered by Marshall (1920) and also Krugman (1991a). Both studies emphasize that industries can be regarded as complements of each other in localities. Actually such an approach is later evaluated by Venables (1996) remarking the industrial interactions can be informative to investigate the agglomeration of economic activity, thus location choice of firms. Such a between industry effects can best be evaluated by using the industry value added numbers, however again due to data availability, the study uses a proxy for inter industry relationships. A share measure is computed for each sector separately; firm birth value of a sector in the overall firm birth volume of a region will represent the density of the region with respect to its entrepreneurial behavior. By doing so, study will be asking whether firm birth density in the other two industries has any effect on the current firm birth numbers of the industry under

[40] A complementary discussion about this issue will be done in chapter 5.

investigation. When the model is augmented into dynamic sense, the study will be searching for the significance of all industries, including the lagged values of the dependent variable.

A third important set that is aimed to be observed is the public policy side of the relation. While the specific place of infrastructure and role of public policy in this infrastructure expansion is widely discussed in regional economics, it is a rare discussion in the new firm start up literature; both theoretically and also empirically. However as a very limited number of control variables are preferred and as increasing public policy may somehow be connected with the economic activity of urban areas, per capita public expenditures are also included into the models. Here this indicator captures a number of different public side dynamics. The reason is that this aggregated public expenditure measure has different public expenses running from payments to public sector wage earners to local infrastructure investments; thus also somehow accounts for the demand side of the overall model coming from the wage payments. Although expectations regarding the effect of public expenditures are contradictory, the central question still finds it important to include the variable as one of the major dynamics behind the process.

Finally a unique dummy is used in the model; aim is to capture the effects of the 2001 crisis in Turkey. This will help the model to control for the impacts of the financial turmoil of 2001 on the real side of the economy.

4.2 Panel Data Analysis

In line with the desire to investigate the new firm start ups' behavior for the provinces of Turkey for a given time period combining the cross section and time dimension in a single model is found to be informative. In this sense this specific problem can be observed with the help of panel data. Panel data is just the pooling of observations on a group of cross sections (Baltagi, 2005: 1). While the cross sections under concern can be firm, household; they can also be countries or regions. Within this framework there are numerous benefits of using panel data with respect to individual time series or cross sectional studies. As discussed by Hsiao (2005: 3) and Baltagi (2005: 4), the major power of using panel data is the fact that, panel data models allow for individual heterogeneity. While panel data models help observers to capture the dynamics of the adjustment by allowing for individual heterogeneity; those models are also found to be more informative due to the increasing number of observations, which channels through increasing efficiency, increasing degrees of freedom and declining (possible) collinearly between explanatory variables under concern (Baltagi, 2005: 5).

Taking the positive sides of panel data as a fact, one also needs to consider the possible problems of panel data analysis. Hsiao (2005: 8) remarks the heterogeneity and selectivity biases as two central issues while utilizing the panel data. Moreover Baltagi (2005: 7) postulates that panel data analysis has a number of limitations such as; (i) Design and data collection problems, (ii) Distortions of measurement errors, (iii) Selectivity Problems, (iv) Time series dimension for short panels, (v) Possibility of the cross section dependence.

Originating from the discussion a panel data model can be built in the following form, where subscripts i and t denotes cross section and time respectively. Equation 4.1 contains the 'y' as the dependent variable and 'X' is a set of explanatory variables for each cross section 'i' for each time period't'.

[4.1] $$y_{i,t} = \alpha + \beta X_{i,t} + u_{i,t}$$

The introduced panel data model in equation 4.1 can be estimated by using distinct estimation techniques. The study will choose to follow the one way error correction component regression models with fixed effect and random effect discussions and moreover dynamic panel data models. The one way error component can be decomposed as follows; $u_{i,t} = \mu_i + v_{i,t}$ where μ denotes the unobserved individual effects, v denotes the remaining errors. The enduring discussion is regarding the unobserved individual effects; whether these effects are fixed or random.

4.2.1 Fixed Effect Models

Baltagi (2005: 12) underlines that fixed effect models are appropriate in case, the study focuses on a given set of firms, countries or regions. Revisiting equation 4.2, the fixed effect model can be constructed as follows;

[4.2] $y_{i,t} = \alpha + \beta X_{i,t} + \mu_i + v_{i,t}$

In the case of fixed effect models μ_i is assumed to be a fixed parameter and is by construction correlated with explanatory variables unlike the random effect model. Meanwhile $v_{i,t}$ is the IID $(0, \sigma_v^2)$ stochastic disturbance. Moreover $X_{i,t}$ can not be correlated with $v_{i,t}$.

The background of the fixed effect model estimation is to eliminate the unobserved effect. Wooldridge (2001: 267) emphasizes that such an elimination calls for different transformation techniques. The within transformation, which can also be labeled as the fixed effects transformation, is a two step process. The general fixed effect model presented in equation 4.2 is first averaged and transformed into equation 4.3.

[4.3] $\bar{y}_i = \alpha + \beta \bar{X}_i + \mu_i + \bar{v}_i$

The second step of the procedure is to subtract equation 4.3 from equation 4.2 and obtain the following;

[4.4] $$y_{i,t} - \bar{y}_i = \beta(X_{i,t} - \bar{X}_i) + v_{i,t} - \bar{v}_i$$

Wooldridge (2001: 267) and Baltagi (2005: 14) summarized equation 4.4 as;

[4.5] $$\ddot{y}_{i,t} = \beta \ddot{X}_{i,t} + \ddot{v}_{i,t}$$

where; $\ddot{y}_{i,t} = y_{i,t} - \bar{y}_i$, $\ddot{X}_{i,t} = X_{i,t} - \bar{X}_i$ and $\ddot{v}_{i,t} = v_{i,t} - \bar{v}_i$

Estimating equation 4.5 by using pooled Ordinary Least Squares (OLS) seems to be accurate due to the fact that the unobserved effect of the model is removed, which by construction is allowed to be correlated with the explanatory variables. The estimated β of the fixed effect model will be the within estimator.

[4.6] $$\hat{\beta}_{FE} = \left[\sum_{i=1}^{N} \sum_{t=1}^{T} \ddot{X}'_{i,t} \ddot{X}_{i,t} \right]^{-1} \left[\sum_{i=1}^{N} \sum_{t=1}^{T} \ddot{X}'_{i,t} \ddot{y}_{i,t} \right]$$

4.2.2 Random Effect Models

In the case of random effect models, the unobserved effect is assumed to be random. Baltagi (2005: 14) emphasized that due to the shortcomings of fixed effect models, if one is drawing a pre determined number of individuals from a large population randomly, usage of a random effect models seems to be appropriate.[41] The most common example is the household surveys. Green (2008: 200) also argued that if the expected individual effects are uncorrelated with the regressors, unlike the fixed effect models, then modeling the individual specific constant terms by randomly distributing across cross section units will be more appropriate.

The same equation 4.2 can be followed with the assumptions that both μ_i and $v_{i,t}$ are IID $(0, \sigma_\eta^2)$. [42] Moreover μ_i should be independent from $v_{i,t}$, like $X_{i,t}$ can not be correlated with μ_i and $v_{i,t}$.

Unlike the fixed effect model; which eliminates the unobserved effect during the estimation procedure, random effect model contains the unobserved effect which is assumed to be non-correlated with the explanatory variables. The efficiency is that random effect model accounts for the implied serial correlation in the composite error component by using a Generalized Least Squares (GLS) analysis (Wooldridge, 2001). Baltagi (2005) adds that the variance-covariance matrix, denoted by Ω, implies homoskedastic variance (Equation 4.7). The serial correlation is also allowed for the disturbances for the same individuals over time.

[41] Baltagi (2005: 14) underlines that fixed effect model contains too many parameters and has the problem of loss of degrees of freedom.
[42] Where η represents μ and v respectively.

[4.7] $\text{var}(u_{i,t}) = \sigma_\mu^2 + \sigma_v^2$

$\text{cov}(u_{i,t}, u_{j,s}) = \sigma_\mu^2 + \sigma_v^2$ thus $\rho = 1$ for i=j and t=s

$\text{cov}(u_{i,t}, u_{j,s}) = \sigma_\mu^2$ thus $\rho = \sigma_\mu^2 / (\sigma_\mu^2 + \sigma_v^2)$ for i=j but t≠s

$\text{cov}(u_{i,t}, u_{j,s}) = 0$ thus $\rho = 0$ otherwise

Following equation 4.7 and in the panel data context, the feasible GLS (FGLS) estimator, which uses Ω, can be labeled as the random effect estimator (Green, 2008: 202 and Wooldridge, 2001: 259). The discussed random effect estimator is represented in equation 4.8.

[4.8] $$\hat{\beta}_{RE} = \left[\sum_{i=1}^{N} X_i^{l} \hat{\Omega}^{-1} X_i \right]^{-1} \left[\sum_{i=1}^{N} X_i^{l} \hat{\Omega}^{-1} y_i \right]$$

4.2.3 Fixed Effect vs. Random Effect Models – Hausman Specification Test –

Previous sub sections underline the background of the fixed effect and random effect panel data models. However the central question is the choice of the accurate model during the estimation procedure. As emphasized previously for random draws from a given population, random effect models seems to be appropriate, whereas in case study deals with a given set of firms, regions, countries or individuals in short, fixed effect models can be preferred. (Hsiao 2005: 27, Baltagi 2005: 12, Wooldridge 2001: 288, Green 2008: 194)

Baltagi (2005: 66) argues that the central assumption that error component should not be correlated with the explanatory variables is critical. Especially the unobserved individual effects may be correlated with the explanatory variables. In case one is dealing with a fixed effect model, the within transformation process eliminates the danger and the within estimator stays unbiased and consistent (Hausman, 1978). However given that random effect estimator is more efficient, investigation of the consistency of the random effect estimators can yield valuable insight about the usage of random effect model.

Originating from the discussion, Hausman (1978) test can be used to compare the efficiency as well as the consistency of the random effect GLS estimator. Test statistic is represented in equation 4.9. Since fixed effect estimates are consistent even unobserved error component is correlated but random effect is not, a statistically significant difference is observed to be evidence against the random effect assumption of unobserved errors and the explanatory variables. Here it is worth mentioning that this test will not give the comparison between fixed and random effect models, rather it will contain information regarding the consistency of the random effect model, which is the more efficient model. In this sense, keeping the sampling idea as an important benchmark to decide the right model to evaluate, it is still informative to check the consistency of the efficient random effect GLS estimator.

[4.9] $$(\hat{\beta}_{FE} - \hat{\beta}_{RE})' \left[\text{var}(\hat{\beta}_{FE}) - \text{var}(\hat{\beta}_{RE}) \right]^{-1} (\hat{\beta}_{FE} - \hat{\beta}_{RE})$$

where; H_0 : $\hat{\beta}_{FE}, \hat{\beta}_{RE}$ are consistent but $\hat{\beta}_{FE}$ is inefficient

H_1: $\hat{\beta}_{FE}$ is consistent and efficient, $\hat{\beta}_{RE}$ is inconsistent

4.2.4 Dynamic Panel Models

So far two different panel data models are considered with the common property of static structure. Panel data models are also very applicable to dynamic observations. It seems evident that many economic questions in mind can be better evaluated with the introduction of dynamic panel data models, which helps investor to better understand the dynamics of the process (Baltagi, 2005: 135). Similarly, Bond (2002) demonstrated numerous benefits of dynamic panel data models over cross section and time series observations. First of all the static behavior of cross section studies prevent the construction of dynamic processes. Moreover time series analysis to account for dynamic models may be containing hidden aggregation biases. In addition to the discussed positive sides of panel data analysis, the inclusion of the lagged dependent variable as regressors to the model should be considered to be affecting the system in two ways; (i) over the individual lagged effect, (ii) over the remaining regressors, which may be affected by the inclusion of the lagged dependent variable.

The dynamic panel data model can be represented with the inclusion of the lagged dependent variable as a regressor. Equation 4.10 follows a one way error component, where both components are IID (0, σ), independent of each other and among themselves.

[4.10] $y_{i,t} = \alpha + \beta X_{i,t} + \delta y_{t-1} + \mu_i + v_{i,t}$

Estimation process of a dynamic panel model is problematic. Inclusion of the lagged dependent variable causes the following problem; as $y_{i,t}$ is a function of μ_i, $y_{i,t-1}$ will also be a function of μ_i. In short the lagged dependent variable of the dynamic model becomes correlated with the error term. This causes the OLS estimator to be biased and inconsistent (Baltagi, 2005: 135). In line with the tradition transformation techniques of panel data, one way is trying to wipe out the effect by following the within transformation procedure. Such a procedure while eliminates μ_i, coming from the construction of the model, $(y_{i,t-1} - \bar{y}_{i,t-1})$ will continue to be correlated with the $(v_{i,t} - \bar{v}_i)$. Bond (2002: 5) and Baltagi (2005: 135) remark that for panels with fixed time dimensions the within estimator gives biased and inconsistent estimates, however for panels in which time dimension goes to infinity, within estimator can be applicable.[43] Similarly considering the same model in a random effect context continues to be problematic (Baltagi, 2005: 136 and Greene: 242 2008). The GLS estimator of the random effects again gives biased

[43] See Islam (1995) and Judson and Owen (1999) for a brief discussion of the relation between the applicability of the within transformation and the size of the time dimension.

results. The quasi demeaning is performed and $(y_{i,t-1} - \theta \bar{y}_{i,t-1})$ is found to be correlated with $(u_{i,t} - \theta \bar{u}_{i,t-1})$ (Baltagi, 2005: 136).

As the fixed effect and random effect estimation techniques seem to give biased and insufficient estimation results, by using OLS and GLS, different models should be considered. An alternative estimation procedure to the proposed model introduced by following instrumental variables (IV) approach (Anderson and Hsiao, 1982). The process initially removes the individual effect by first differencing the dynamic model. As discussed by Bond (2002: 7) $\Delta y_{i,t}$ depends on $v_{i,t-1}$ and this causes the OLS estimations to be inconsistent. However the opportunity to estimate the same equation by two stage least squares (2SLS) with instrumental variables can help the model end up with consistent estimates. $\Delta y_{i,t-2} = (y_{i,t-2} - y_{i,t-3})$ or $y_{i,t-2}$ can be used as an instrument for $\Delta y_{i,t-1} = (y_{i,t-1} - y_{i,t-2})$ with the condition that these instruments will not be correlated with the $\Delta v_{i,t} = v_{i,t} - v_{i,t-1}$ (Anderson and Hsiao, 1982). Although such a process yields consistent estimates, they do not need to be efficient (Bond, 2002: 8 and Baltagi, 2005: 136). The background of the inefficiency is related with two main issues. First IV estimation method does not take into account the all available moment conditions (Ahn and Schmidt, 1995). Moreover IV approach also neglects the differenced structure on the residual disturbances. Above all using the lagged dependent variable as an instrument in its level or in its first differenced shape is also crucial. Arrelano and Bond (1991) recommend the usage of the instruments in their levels.

Hansen (1982) proposes The Generalized Method of Moments (GMM) as a suitable framework to obtain efficient estimates. Later the process is transformed into AR (1) panel data

context by Arellano and Bond (1991). First consider the dynamic model introduced in equation 4.10 in an autoregressive form.

[4.11] $$y_{i,t} = \alpha + \delta y_{t-1} + \mu_i + v_{i,t}$$

Equation 4.11 specifies a panel model with only the lagged dependent variable as the regressor. The first differenced transformation method can be applied and equation 4.12 can be modeled.

[4.12] $$y_{it} - y_{i,t-1} = \delta(y_{i,t-1} - y_{i,t-2}) + (v_{it} - v_{i,t-1})$$

Equation 4.12 does not contain the individual effects but still does not account for the differenced error term (Baltagi, 2005: 137). Arellano and Bond (1991) constructed the following instrument matrix where each row represents the first differenced GMM.

$$[4.13] \quad Z = \begin{bmatrix} y_{i1} & & & \\ & y_{i1}, y_{i2} & & \\ & & \ldots & \\ & & \ldots & \\ & & & \mathrm{y}_{\mathrm{i1}\ldots\ldots}..y_{it-2} \end{bmatrix}$$

The Z matrix exploits the moment condition given by $E(Z_i^l \Delta v_i) = 0$. The asymptotically efficient GMM estimator minimizes the following criterion based on the moment conditions;

$$[4.14] \quad J_N = \left(\frac{1}{N} \sum_{i=1}^{N} \Delta v_i^l Z_i \right) W_N \left(\frac{1}{N} \sum_{i=1}^{N} Z_i^l \Delta v_i \right)$$

Bond (2002) emphasized that using the weight matrix defined in equation 4.15, the one-step consistent Arrelano and Bond (1991) estimator can be obtained. In both equation defined, H is a (T-2) square matrix, with 2's on the main diagonal, -1's on the first off-diagonals and zeros elsewhere (Bond, 2002: 9).[44]

$$[4.15] \quad W_{1N} = \left[\frac{1}{N} \sum_{i=1}^{N} (Z_i^l H Z_i) \right]^{-1}$$

[44] A detailed debate regarding the root of the weight matrix in equation 4.15 can be followed in Bond (2002).

[4.16] $$\hat{\delta} = \left[(\Delta y_{-1})^{l} W (W^{l}(I_N \otimes H)W)^{-1} W^{l}(\Delta y_{-1})\right]^{-1} x \left[(\Delta y_{-1})^{l} W (W^{l}(I_N \otimes H)W)^{-1} W^{l}(\Delta y)\right]$$

A replication of the weight matrix presented in equation 4.15, yields equation 4.17. The difference between the weight matrices is that, equation 4.15 is not related with the estimated parameters (Bond, 2002: 9).

[4.17] $$W_N = \left[\frac{1}{N}\sum_{i=1}^{N}(Z_i^{l}\,\hat{\Delta v}_i\,\hat{\Delta v}_i^{\,l}\,Z_i)\right]^{-1}$$

Using 4.17 as the weight matrix and applying the above mentioned procedure, the Arrelano Bond (1991) two-step estimator can be obtained.

[4.18] $$\hat{\delta} = \left[(\Delta y_{-1})^{l} W \hat{V}_N^{-1} W^{l}(\Delta y_{-1})\right]^{-1} x \left[(\Delta y_{-1})^{l} W \hat{V}_N^{-1} W^{l}(\Delta y)\right]$$

where $V_N = \sum_{i=1}^{N} W_i^{l}(\Delta v_i)(\Delta v_i)^{l} W_i$

Bond (2002: 9) compared the one-step and two-step estimators. The mentioned significance is the usage of one step estimator to compute the two step estimator. Moreover the dependence of the two step estimator on the parameters of the model is also another concern. Similarly, Bond and Windmeijer (2002) underline that two step estimator tend to end up with smaller standard errors thus bigger t ratios, whereas one-step results seems to be more accurate.

Furthermore in case there are exogenous variables in the model, handling the estimation techniques call for identification of the exogenity of these variables. Under the conditions that the model deals with strictly exogenous variables, these variables can be correlated with the cross section specific effects but should be uncorrelated with the remaining unobserved effects; in case all these strictly exogenous variables can be used as valid instruments for first differenced equation 4.12. In short, $(x_{i1}^{l}, x_{i2}^{l}, ...x_{iT}^{l})$ will be injected into each of the diagonal elements of the instrument matrix in equation 4.13. Resulting matrix can be used in the determination of the one step and two step estimators demonstrated in equation 4.19, of the dynamic panel model with strictly exogenous variables.

$$[4.19] \quad \begin{pmatrix} \hat{\delta} \\ \hat{\beta} \end{pmatrix} = \left[(\Delta y_{-1}, \Delta X)^{l} W \hat{V}_{N}^{-1} W^{l} (\Delta y_{-1}, \Delta X) \right]^{-1} x \left[(\Delta y_{-1}, \Delta X)^{l} W \hat{V}_{N}^{-1} W^{l} (\Delta y) \right]$$

However if the exogenous variables are predetermined then these variables will be correlated with remaining disturbances. In such a case $(x_{i1}^{l}, x_{i2}^{l}, ...x_{iT-1}^{l})$ will be used in the

instrument matrix of 4.13. As defined by Baltagi (2005: 140), following the previously mentioned procedures one step and two step estimators can be computed.

This so called first difference GMM procedure, while heavily used in the empirical literature, it is heavily criticized recently. Following Arellano and Bover (1995) statistical and conceptual problems of using difference GMM is underlined and instead system GMM estimator is advised. Assume that AR (1) type dynamic model is augmented to account for a set of explanatory variables. Equation 4.20 follows a one way error component, where both components are IID (0, σ), independent of each other and among themselves.

[4.20] $$y_{i,t} = \alpha + \beta X_{i,t} + \delta y_{t-1} + \mu_i + v_{i,t}$$

Actually as summarized it is the Arellano and Bond (1991) that emphasized a solution to the estimation process of the equation 4.20. To eliminate the unobserved effect first difference of the equation is computed and equation 4.21 is obtained.

[4.21] $$\Delta y_{i,t} = \beta \Delta X_{i,t} + \delta \Delta y_{i,t-1} + \Delta v_{i,t}$$

As discussed previously estimation of equation 4.21 by Generalized Measure of Moments (GMM) requires the following moment conditions to compute the difference estimator;

[4.22] $E\left[y_{i,t-s}\Delta v_{i,t}\right]=0$ for s≥2, t=3,…..,T

[4.23] $E\left[X_{i,t-s}\Delta v_{i,t}\right]=0$ for s≥2, t=3,…..,T

While the early panel data models relies heavily on the usage of the Arellano and Bond (1991) in the dynamic difference estimation context with these discussed moment conditions, the process is later heavily criticized due to conceptual and statistical problems of using difference estimator (Arrelano and Bover, 1995). Remarks underline that instead of using the difference equation in equation 4.21; one can combine equations 4.20 and 4.21 and form a system to use system GMM. In such a case, instruments for equation in differences will be unchanged -lagged values of the explanatory variables - whereas for the equation in levels lagged differences of the explanatory variables will be used. Such system GMM estimation can be valid under the following moment conditions;

[4.24] $E\left[\Delta y_{i,t-1}(\mu_i+v_{i,t})\right]=0$

[4.25] $E\left[\Delta X_{i,t-1}(\mu_i + v_{i,t})\right] = 0$

Overall the system GMM with the moment conditions described in equations 4.22, 4.23, 4.24 and 4.25 yield consistent and efficient GMM estimators. However as discussed by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998), during the estimation procedure the choice of right instruments is vital. Sargan and Hansen tests actually evaluates the validity of the instruments used in the estimation procedure with the null hypothesis that instruments used are not correlated with the residuals (Sargan, 1958 and Hansen, 1982). One important property of the statistics is that in case one is concerned about the heteroscedastic disturbances, calculation of robust standard errors class for the usage of Hansen (1982) statistic (Rodman, 2006). However this also brings additional concerns about the number of instruments preferred. If number of instruments outperforms the observation number Hansen statistic is blamed to be weakened. Finally testing the presence of second order auto correlation in errors is also a necessity to test the applicability of the dynamic model. Note that as the models are in dynamic nature, assessment of the first order autocorrelation is unnecessary.

4.3 Measuring Dispersion

Other than understanding the determinants of the constructed hypotheses, constructed central question also aims to answer an important matter regarding the inequality of firm births among regions of Turkey. As will be debated in chapter 5, before starting the panel data models,

investigation of the new firm formation dispersion is a necessity.[45] While geographic matters of the discussion are left to chapter 6, understanding the distribution of the new firm start ups is inevitable before constructing the models.[46] From this point of view, observing the phenomenon may help social scientist in Turkey to evaluate the significance of firm birth, thus entrepreneurial behavior at the province level. At this point, the reader should be aware of the fact that; it is the combination of the panel data analysis and the dispersion analysis that at the end will shed light on the business environment of Turkey.

Different measures can be preferred as to understand the distribution of firm formation such as traditional measures; standard deviation, convergence measures etc. As described by Baumol et al. (1994: 7), coefficient of variation is one of the major but not the least tools to be used to capture the dispersion. For each group of cross sections "i" at time "t", the observed deviation pattern will be standardized by the cross sections' mean. The pattern will help us to comment on the variation of regional firm formation rates. Equation 4.26 gives the coefficient of variation (CV) of newly formed firm numbers; where σ represents the standard deviation of cross sections at time "t" and μ represents the mean of cross sections at time "t". Increasing coefficient of variation will mark the increasing inequality between urban areas of Turkey and vice versa. In addition to the approach debated above, different convergence measures can also be tested. Beta and sigma convergence may enter the realm of the debate. However the study will prefer to just implement sigma convergence as illustrated in equation 4.27.

[45] Also to carry out the income convergence discussion in chapter 3, similar computations have already been implemented.

[46] Note that the spatial analysis and maps that will be illustrated will also contain valuable information about the dispersion of economic activity spatially in Turkey.

[4.26] $$CV_t = \frac{\sigma_t}{\mu_t}$$

[4.27] $$\sigma_t = [\frac{1}{N}\sum_{1}^{N}[\ln(y_{i,t}) - \mu_t]^2]^{1/2}$$

5. Dispersions and Dynamics of New Firm Start Ups in Turkey

This chapter forms the background of the overall conclusions that are expected to be constructed at the end of this dissertation. In line with the already mentioned objectives and also the ongoing debate, the questions regarding the distribution of new firm start ups both across time and also across space will be evaluated through out the chapter. Moreover after having a detailed understanding about the variation of new firm start up activity across time and space in Turkey, the study will carry out the discussion towards understanding the possible background reasons behind this variation. Here it is worth remarking that the overall structure of the ongoing chapter is constructed over the methodological discussion of chapter four, thus both the dispersion as well as the dynamics of the firm formation process will be investigated without taking into account spatial interactions and also role of geography. However in the scope of the central theme of the dissertation, findings of this chapter will at the end combined with the following chapter that will introduce the place of geography into the discussion.

Here it is worth mentioning that third chapter's remark regarding the regional inequality phenomenon in Turkey is a vital motivation for the ongoing chapter. However, coming from the interconnection between the concepts related with regional prosperity and regional economic activity, this part of the dissertation calls for a difficult but also very informative interpretation. In this sense major mechanics discussed in chapter 4 will also be revisited through out the chapter.

Here an important confusion will be related with the observations of the third chapter's last section. It is already determined and concluded that firm formation is a vital element of regional development in terms of regional income. However as it will be revisited for a few more times through out the chapter, regional development (and even income) will be regarded as important determinants of firm formation process. So the circular causation problem will always stand at the center of the analyses (Krugman, 1995). However one can simplify this complexity by concentrating on the main motivation; keeping in mind the importance of firm formation as a proxy of economic activity (meaning income generation potentials through various channels as discussed in chapter 2), central objective should be what accounts for the location decision of agents representing economic activity. Here as income will be regarded as a demand potential indicator, it is inevitable to consider it through out the model. If somehow it was possible to use household demand or consumption indicators for the case, it may be more appropriate; however based on the already mentioned data constraints this will not be possible for the ongoing study. These concerns and remarks will be revisited and discussed once more after the results are obtained from the constructed models.

Originating from these debates, this chapter will first use a number of different tools to see the variation of firm start ups in Turkey, both across time and also space. To do so, while already mentioned tools of the growth theory will be preferred, illustrations regarding the spatial distribution of economic activity in the geography of Turkey will also be carried out.[47] After having a solid understanding regarding the distribution of economic activity in Turkey, the study

[47] Note that different approaches towards evaluating the spatial interactions and mapping the distribution of spatial correlation across space will not be a concern of this chapter. Introduction of possible ways to deal with such interconnections and the results obtained for Turkey regarding these associations will be in the agenda of chapter 6. However at the end it is the combination of chapter 5 and chapter 6 to give a deep insight about the variation of firm formation in Turkey, with special emphasis on the spatial associations, in terms of dependence and heterogeneity.

will be carried out towards identification of the major motives behind this process, by using the already mentioned possible regional mechanics defining the impacts of the social and economical properties of regions. Here it is noteworthy to remark once more that different panel data tools will be evaluated by using a number of different models, which will be aggregated at the end of the chapter under the general augment model.

5.1 Dispersion of New Firm Start Ups

As already debated in chapter 4, one preferred way to evaluate the dispersion of firm formation in Turkey is coefficient of variation. Similarly sigma convergence can also be used to see the dispersion of new firms.[48] Here an important difficulty during the assessment of path of firm formation dispersion in Turkey is related with the short time dimension of the data set. As regional firm start up data can be obtained for the period of 1997-2006, it seems that evaluating the long run path of the dispersion of the firm formation will not be possible. However findings can still yield information regarding the patterns in the regional firm formation inequalities. Moreover while these sigma convergence and coefficient of variation type of dispersion investigations are informative, it is actually the investigation of spatial distribution of firm formation for 81 urban areas, that is expected to give an insight about the possible agglomeration of different economic activities and moreover some signs of regional divergence (in the sense that divergence of economic activity can be associated with the clustering and/or agglomeration behavior of the economic activity). Here once more, its worth mentioning that concepts of agglomeration and regional divergence are interacting; meaning that agglomeration of economic

[48] See Barro, Sala-i Martin (1992) for investigation of different ways of convergence and divergence. Also revisit chapter 3 for the major studies done for Turkey that tries to use different convergence tools for Turkey, to understand the dispersion of per capita income.

activity can be regarded as a sign of increasing regional inequalities in the economic activity, however it can also be discussed that such an agglomeration behavior in more than a few geographic regions can also be associated with the regional developments, in the case different economic activities are observed to be clustering in different locations. However it should be kept in mind that assessing such a behavior and discussing whether agglomeration of economic activity is associated with regional inequalities or regional development is another issue, which is outside the scope of the discussion that is carried out so far.

To begin with the dispersion of economic activity for three different major economic activities in Turkey, first firm start up gross values are investigated .Next the discussion is carried on by using the firm start up rates. Revisiting the discussion in chapter 4 regarding the standardization issues of firm formation, it is the regional population levels that is preferred as the right standardization unit. Based on computed firm start up rates for three of the economic activities the search is carried towards evaluation of the inequality of these activities among the 81 provinces of Turkey, for a very limited time period from 1997 to 2006. In this sense figures 5.1 to 5.3 represent the coefficient of variation of new firm start up gross values and figures 5.4 to 5.6 accounts for the same issue for the firm start up rates in Turkey for manufacturing, services and trade. Following set of figures 5.7 to 5.9 and 5.10 to 5.12 are the sigma convergence measures for the same industries in the same order for gross values and also computed rates.

Figure 5.1: CV. Manufacturing Sector New Firm Start-ups (Gross)

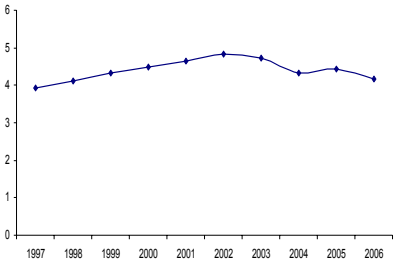


Figure 5.2: CV. Service Sector New Firm Start-ups (Gross)

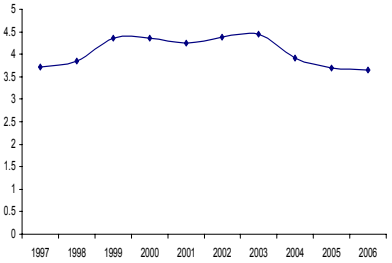
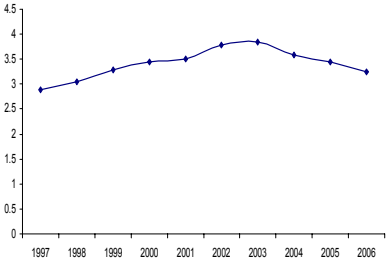


Figure 5.3: CV. Trade Sector New Firm Start-ups (Gross)



Source: TURKSTAT, Author's own calculations

Figure 5.4: CV. Manufacturing Sector New Firm Start-ups (Rates)

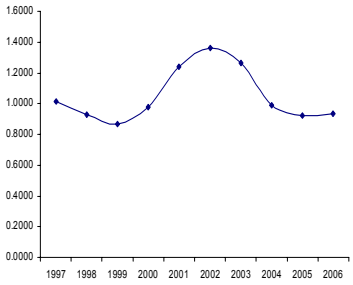


Figure 5.5: CV. Service Sector New Firm Start-ups (Rates)

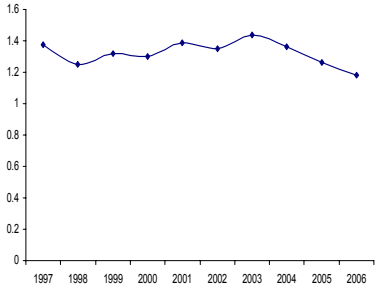
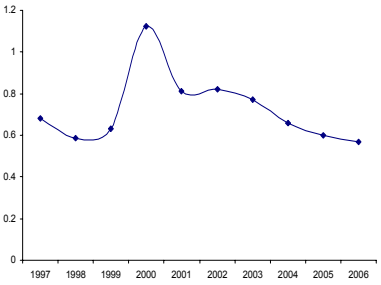


Figure 5.6: CV. Trade Sector New Firm Start-ups (Rates)



Source: TURKSTAT, Author's own calculations

Figures regarding the coefficient of variation give limited information. While gross values of the new firm start up numbers give a relatively stable path for the ten year period, computed rates give some additional information. For manufacturing there seems to be a worsening during the crisis of 2001 period, which also collides with the post 1999 earthquake period that heavily affected the manufacturing industry located in the Marmara district. For services and trade

sectors, while the paths are not identical, one can talk about a limited sign of decline on the rates in favor of a limited convergence of the firm formation number regionally, if 1997 and 2006 values are compared. Note that these preliminary findings are also confronted by the sigma convergence computations. Leaving aside the paths of all measures, at the end for manufacturing industry we can not talk about a convergence of firm formation gross values and also rates, while for services and also trade sectors one can emphasize a limited convergence of the firm formation gross values and rates, again if 1997 and 2006 figures are compared. Here it is worth emphasizing that dynamics (or cycles) realized in the short time span can not be evaluated, so it is found more informative just to give a general insight regarding the firm formation inequalities by using the tools of sigma convergence and also coefficient of variation. Remarks will be widened by observing the spatial patterns in Turkey.

Figure 5.7: Sigma Convergence Manufacturing Sector New Firm Start-ups (Gross)

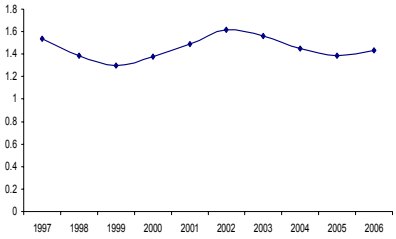


Figure 5.8: Sigma Convergence Service Sector New Firm Start-ups (Gross)

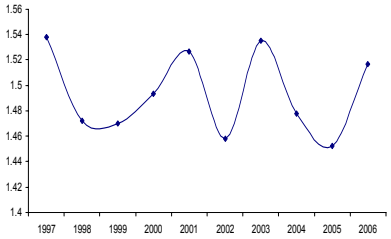
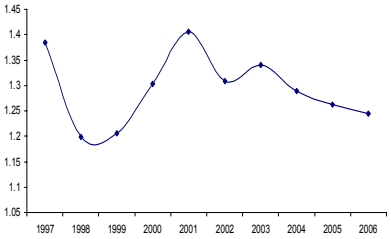


Figure 5.9: Sigma Convergence Trade Sector New Firm Start-ups (Gross)



Source: TURKSTAT, Author's own calculations

Figure 5.10: Sigma Convergence Manufacturing Sector New Firm Start-ups (Rates)

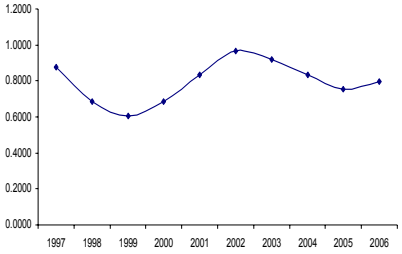


Figure 5.11: Sigma Convergence Service Sector New Firm Start-ups (Rates)

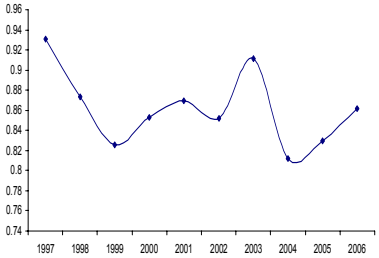
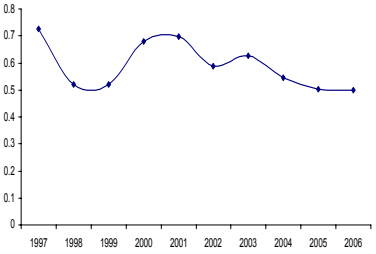


Figure 5.12: Sigma Convergence Trade Sector New Firm Start-ups (Rates)



Source: TURKSTAT, Author's own calculations

While these preliminary findings are informative as to give a sight about the direction of the dispersion in Turkey, observing the spatial patterns is expected to be more valuable. Originating from this objective, first runner ups and lagging urban areas of Turkey are reported from tables 5.1 to 5.3 for manufacturing, services and trade sectors by comparing the firm start ups gross values. Hence information contained in the tables may show limited but again valuable information regarding the roots of the previously mentioned findings.

Table 5.1: Manufacturing New Firm Start-ups Ranking (Gross Values)

Rank	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
1	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul
2	Ankara	Ankara	Ankara	Ankara	Ankara	İzmir	İzmir	Ankara	Ankara	Ankara
3	İzmir	İzmir	İzmir	İzmir	İzmir	Ankara	Ankara	İzmir	İzmir	İzmir
4	Bursa	Bursa	Bursa	Bursa	Bursa	Bursa	Bursa	Bursa	Bursa	Bursa
5	Antalya	Konya	Konya	Antalya	Antalya	Antalya	Antalya	Antalya	Antalya	Antalya
77	Hakkari	Hakkari	Ardahan	Bayburt	Hakkari	Hakkari	Kilis	Hakkari	Bitlis	Bingöl
78	Kilis	Bayburt	Bayburt	Bitlis	Ardahan	Tunceli	Bayburt	Bayburt	Bingöl	Tunceli
79	Siirt	Gümüşhane	Hakkari	Ardahan	Artvin	Muş	Muş	Iğdır	Tunceli	Gümüşhane
80	Tunceli	Tunceli	Tunceli	Tunceli	Bayburt	Kilis	Ardahan	Ardahan	Ardahan	Ardahan
81	Bitlis	Kilis	Kilis	Kilis	Tunceli	Ardahan	Tunceli	Tunceli	Hakkari	Hakkari

Source: TURKSTAT

Table 5.2: Service Sector New Firm Start-ups Ranking (Gross Values)

Rank	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
1	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul
2	Ankara	Ankara	Ankara	Ankara	Ankara	Ankara	Ankara	Ankara	Ankara	Ankara
3	İzmir	İzmir	İzmir	İzmir	İzmir	İzmir	İzmir	Antalya	Antalya	Antalya
4	Antalya	Antalya	Antalya	Antalya	Antalya	Antalya	Antalya	İzmir	İzmir	İzmir
5	Muğla	Muğla	Bursa	Bursa	Muğla	Muğla	Bursa	Muğla	Muğla	Muğla
77	Bayburt	Bayburt	G.shane	Tunceli	Bayburt	Kırşehir	Tunceli	Siirt	Bitlis	Tunceli
78	Ardahan	Bitlis	Tunceli	Gümüşhane	Ardahan	Bartın	Bayburt	Bayburt	Bilecik	Ardahan
79	Bitlis	Bartın	Bartın	Bayburt	Bartın	Tunceli	Hakkari	Kilis	Bayburt	Çankırı
80	Kilis	Kilis	Düzce	Ardahan	Hakkari	Şırnak	Siirt	Ardahan	Ardahan	Hakkari
81	Siirt	Siirt	Kilis	Siirt	Tunceli	Kilis	Kilis	Tunceli	Kilis	Kilis

Source: TURKSTAT

Table 5.3: Trade New Firm Start-ups Ranking (Gross Values)

Rank	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
1	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul	İstanbul
2	Ankara	Ankara	Ankara	Ankara	Ankara	Ankara	Ankara	Ankara	Ankara	Ankara
3	İzmir	İzmir	İzmir	İzmir	İzmir	İzmir	İzmir	İzmir	İzmir	İzmir
4	Antalya	Antalya	Antalya	Antalya	Antalya	Antalya	Antalya	Antalya	Antalya	Antalya
5	Konya	Bursa	Bursa	Şırnak	Bursa	Bursa	Bursa	Bursa	Bursa	Bursa
77	Gümüşhane	Bartın	Gümüşhane	Kilis	Çankırı	Ardahan	Ardahan	Karabük	Bartın	Hakkari
78	Kilis	Sinop	Tunceli	Kastamonu	Ardahan	Gümüşhane	Tunceli	Tunceli	Tunceli	Bayburt
79	Tunceli	Bayburt	Ardahan	Tunceli	Kilis	Tunceli	Bayburt	Bayburt	Bayburt	Kilis
80	Ardahan	Kilis	Bayburt	Bayburt	Gümüşhane	Kilis	Gümüşhane	Iğdır	Ardahan	Tunceli
81	Bayburt	Tunceli	Kilis	Gümüşhane	Tunceli	Bayburt	Kilis	Ardahan	Kilis	Ardahan

Source: TURKSTAT

Listed tables contain just the information of the most successful and unsuccessful five provinces of Turkey for a 10 year period. In this sense, first importance vital finding is the dominance of the three major metropolitan areas; Istanbul, Izmir and Ankara. Note that regardless of the economic activity, these cities represent the core of the new firm formation activities. Moreover for the lagging worst five urban areas, findings indicate that geographical location matters for the new firm activities. A clear west and east separation can be capture. As to have a deeper insight about the number of new firm start ups at NUTS 1 level for these three economic activities, see appendix A; observations will underline again clear cut between west and east regions of Turkey. Here one can also determine the low turnover (transitivity) between provinces' ranking, which actually give an idea about the persistence of the new firm formation structure in Turkey. To enter the roots of these debates, by using the NUTS 1 agglomeration for provinces, geographic dispersion of economic activity is tried to be evaluated. For each separate economic activity, regions are compared with the Turkey averages for that year. Results are reported in table 5.4, 5.5, 5.6 and contain vital information about the distribution of economic activity among the 12 geographic regions of Turkey. Moreover here findings can also be regarded as introduction level information for the coming observation about the spatial examination of economic activity distribution.

Preliminary representation regarding the manufacturing new firm start ups can be followed in table 5.4. Here it is evident that regions of Istanbul, East Marmara, Aegean, and West Anatolia outperform Turkey's averages. Moreover it can easily be observed that Istanbul by itself captures most of the new firm start ups in Turkey. While the number in Istanbul declines during the crises of 2001, it still outperforms Turkey with an increasing trend that reached to six times the Turkey's average in 2001. On the other hand when the east regions of Turkey observed, the

very low value of Northeast Anatolia is striking, leaving aside the lagging nature of East Blacksea and Middle East Anatolia regions. Other geographies of Central Anatolia, West Blacksea and South Anatolia also are the regions with lack of regional development in terms of economic activities for the same period.

Table 5.4: Manufacturing New Firm Start ups Relative to Turkey Average (Gross) (a)

NUTS 1 Region	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TR1 Istanbul	5.071	5.372	5.691	5.878	6.049	6.317	6.172	5.644	5.805	5.422
TR2 West Marmara	0.238	0.209	0.270	0.216	0.215	0.232	0.215	0.231	0.247	0.272
TR3 Aegean	1.667	1.530	1.391	1.407	1.483	1.535	1.495	1.567	1.326	1.526
TR4 East Marmara	1.104	1.076	0.857	0.812	1.011	0.965	1.035	1.089	1.076	1.225
TR5 West Anatolia	1.495	1.415	1.318	1.235	1.288	1.164	1.139	1.258	1.343	1.332
TR6 Mediterranean	1.030	0.854	0.761	0.823	0.796	0.806	0.821	0.842	0.816	0.867
TR7 Central Anatolia	0.357	0.340	0.348	0.324	0.262	0.223	0.240	0.351	0.333	0.333
TR8 West Blacksea	0.284	0.311	0.264	0.279	0.191	0.165	0.203	0.262	0.274	0.303
TR9 East Blacksea	0.144	0.167	0.175	0.137	0.142	0.081	0.084	0.142	0.134	0.146
TRA Northeast Anatolia	0.075	0.115	0.201	0.126	0.059	0.061	0.061	0.075	0.097	0.062
TRB Middle East Anatolia	0.115	0.160	0.209	0.189	0.116	0.104	0.117	0.124	0.119	0.098
TRC Southeast Anatolia	0.421	0.452	0.515	0.573	0.388	0.348	0.418	0.418	0.431	0.413

Source: TUKRSTAT, Author's own calculations
(a) Turkey Average=1.00

When the same observation is carried towards behavior of new firms for service sector, findings indicate that similar to manufacturing sector, Istanbul, West Anatolia, Aegean and this time additionally Mediterranean regions outperform Turkey's averages. Table 5.5 gives a brief summary of service sector findings. Moreover West Anatolia's success seems to be higher in the service sector in terms of new firm start up behavior. Similarly Mediterranean also seems to be an important region for service sector development; note that its dominance here can be appreciated based on its performance during the last three years. Regarding the lagging geographic areas the same structure persists with the Northeast Anatolia at the worst place among 12 NUTS 1 regions.

Table 5.5: Services New Firm Start ups Relative to Turkey Average (Gross) (a)

NUTS 1 Region	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TR1 Istanbul	4.507	7.134	6.721	6.014	6.496	7.219	7.785	6.585	5.661	5.306
TR2 West Marmara	0.279	0.193	0.150	0.168	0.171	0.141	0.141	0.171	0.197	0.261
TR3 Aegean	1.750	1.182	1.261	1.223	1.168	1.131	0.931	1.131	1.427	1.497
TR4 East Marmara	0.786	0.466	0.540	0.619	0.577	0.460	0.446	0.501	0.648	0.729
TR5 West Anatolia	2.115	1.321	1.631	2.075	1.781	1.459	1.201	1.565	1.648	1.702
TR6 Mediterranean	1.480	0.871	0.789	0.908	0.973	0.863	0.897	1.143	1.348	1.414
TR7 Central Anatolia	0.234	0.174	0.192	0.190	0.192	0.171	0.134	0.233	0.247	0.249
TR8 West Blacksea	0.233	0.150	0.134	0.190	0.154	0.136	0.131	0.155	0.227	0.201
TR9 East Blacksea	0.213	0.130	0.127	0.103	0.114	0.104	0.085	0.110	0.138	0.182
TRA Northeast Anatolia	0.060	0.059	0.087	0.085	0.080	0.058	0.026	0.054	0.066	0.076
TRB Middle East Anatolia	0.114	0.108	0.155	0.146	0.089	0.115	0.059	0.113	0.144	0.136
TRC Southeast Anatolia	0.228	0.213	0.214	0.280	0.203	0.143	0.164	0.239	0.249	0.248

Source: TUKRSTAT, Author's own calculations

(a) Turkey Average=1.00

Finally same procedure is replicated for the trade sector and reported in table 5.6. Findings indicate that Istanbul, Aegean, West Anatolia and Mediterranean regions outperforms the Turkey averages. Note that for trade sector, East Marmara no loner outperforms the country averages. More interestingly when the lagging regions are observed, it is interesting and noteworthy to underline the increasing performance of Southeast Anatolia and other lagging regions. However in terms of the ranking the structure still persists.

Table 5.6: Trade New Firm Start ups Relative to Turkey Average (Gross)

NUTS 1 Region	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TR1 Istanbul	3.525	4.123	3.982	3.839	3.711	4.462	4.992	4.179	3.816	3.742
TR2 West Marmara	0.363	0.313	0.342	0.267	0.279	0.270	0.298	0.305	0.354	0.418
TR3 Aegean	1.565	1.535	1.478	1.347	1.704	1.533	1.457	1.516	1.548	1.647
TR4 East Marmara	0.976	0.953	0.771	0.816	0.881	0.803	0.782	0.802	0.867	0.996
TR5 West Anatolia	1.925	1.565	1.601	1.795	1.844	1.715	1.588	1.681	1.760	1.636
TR6 Mediterranean	1.561	1.313	1.149	1.234	1.436	1.397	1.271	1.458	1.465	1.406
TR7 Central Anatolia	0.523	0.439	0.373	0.338	0.383	0.333	0.316	0.408	0.392	0.404
TR8 West Blacksea	0.420	0.388	0.412	0.301	0.350	0.326	0.314	0.350	0.374	0.406
TR9 East Blacksea	0.284	0.310	0.257	0.226	0.205	0.212	0.137	0.234	0.234	0.210
TRA Northeast Anatolia	0.132	0.215	0.330	0.236	0.203	0.161	0.134	0.163	0.207	0.164
TRB Middle East Anatolia	0.189	0.288	0.590	0.587	0.278	0.284	0.236	0.271	0.303	0.273
TRC Southeast Anatolia	0.537	0.558	0.716	1.015	0.726	0.504	0.475	0.634	0.680	0.698

Source: TUKRSTAT, Author's own calculations
(a) Turkey Average=1.00

Overall if calculations here are combined with the gross regional firm formation numbers for the three economic activities reported in appendix A, the agglomeration of economic activity, accounted by the new firm numbers, around the west regions from Marmara district towards the coastal lines of the Aegean Region towards the Mediterranean Region can be observed. Here West Anatolia can also be included in this bell shaped region. On the other side of

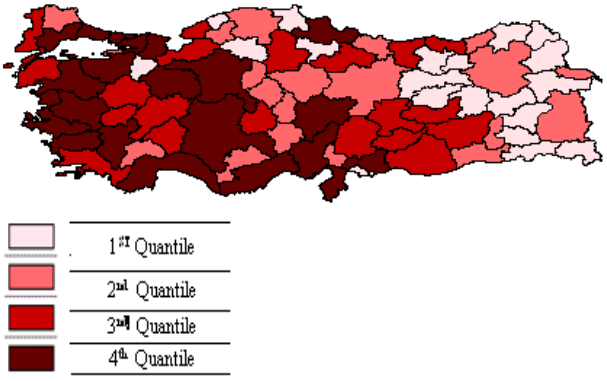
the debate, the reverse (or symmetric) of the development can be observed from Blacksea costal lines towards Northeast Anatolia and towards the Southeast Anatolia. Here this time central Anatolia can be injected in these lagging regions. However to have a better illustrative insight about these developments, one needs to move towards the identification of the spatial distribution of this economic activity. This is where the dispersion across space can be illustrated on the grounds of descriptive measures. Note that as emphasized through out this chapter, identification of the spatial association analytically is another issue and will be done in the coming chapter, by observing the role of geography for the distribution of economic activity.

Originating from this objective, new firm start up (gross) values are mapped for 1997 and 2006 for the three economic activities and reported from figures 5.13 to 5.18. These maps investigate the distribution of the new firms at NUTS 3 level. Illustrations are the classifications, with the dense areas represented by the darker fields.

Figure 5.13 and 5.14 compares the manufacturing new firm formation. Here two cities should take attention. Bilecik seems to be a lagging province in the west, whereas Samsun seems to be the reverse in 1997. Over the ten year period however Bilecik moves to an upper quantile, while Samsun moves to a lower. It should be noted that there are small signs of improvements in the firm formation performances of the Central and West Blacksea region. However Northeast Anatolia and South East Anatolia together with East Blacksea region constitutes the worst manufacturing firm formation regions. Here special emphasis should be given to Gaziantep, Sanliurfa and Diyarbakir as cities of the region with high economic activity. Somehow these cities seem to deviate form the general structure of the region. Moreover they act as the border line between east and west structure. On the other hand the emphasized belt mentioned in the

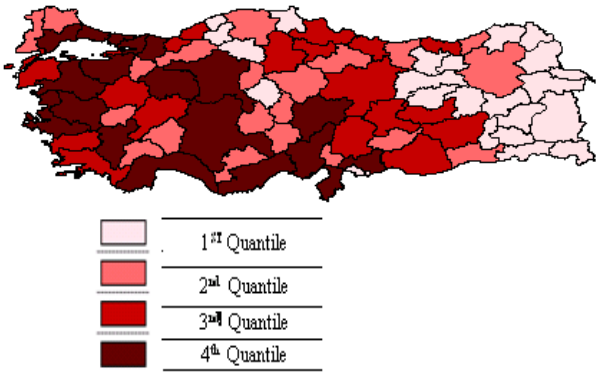
NUTS 1 analysis above, seems to be the persistent in manufacturing. Starting from Istanbul to south costal lines of Turkey, cities are located in the first two quantiles of the firm formation values.

Figure 5.13: Manufacturing Sector New Firm Start-up (1997)



Sources: TURKSTAT

Figure 5.14: Manufacturing Sector New Firm Start-up (2006)

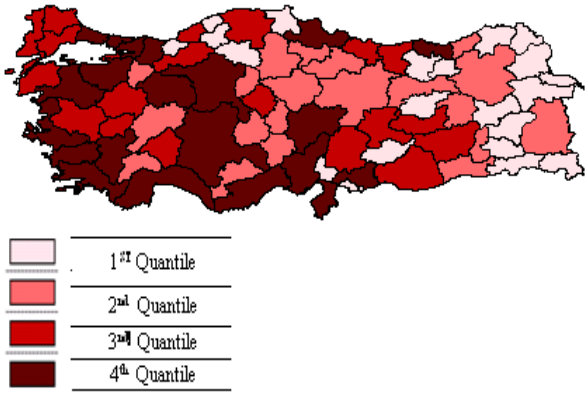


Sources: TURKSTAT

When the same analysis is carried towards the service sector activities, comments regarding the regions with high firm formation performances are still valid and can be capture from figures 5.15 and 5.16. While in 1997 cities located in the west as a belt mainly locates in the first two quantiles, in 2006 only Burdur and Karaman are observed to move to a worse quantile. Also some cities in the West Blacksea region, Bartin, Karabuk and Cankiri are realizing very low levels of service sector firm formation. Again the reverse case is still valid, Northeast Blacksea region, Northeast Anatolia and Southeast Anatolia mainly consists of lagging cities. However cities of the Southeast Anatolia, Diyarbakir, Gaziantep, Sanliurfa have a relatively high firm

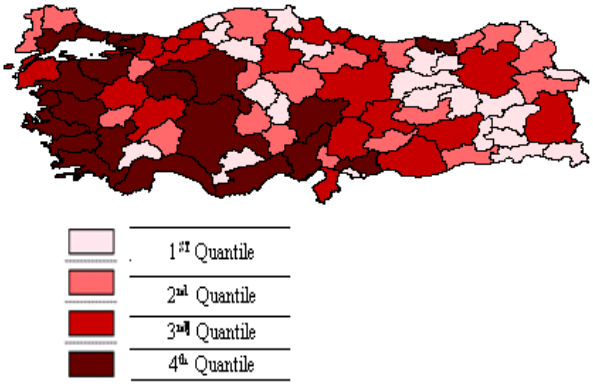
formation potential. Moreover Trabzon is a province persistently belonging to the highest firm formation group for service sector activities.

Figure 5.15: Manufacturing Sector New Firm Start-up (2006)



Sources: TURKSTAT

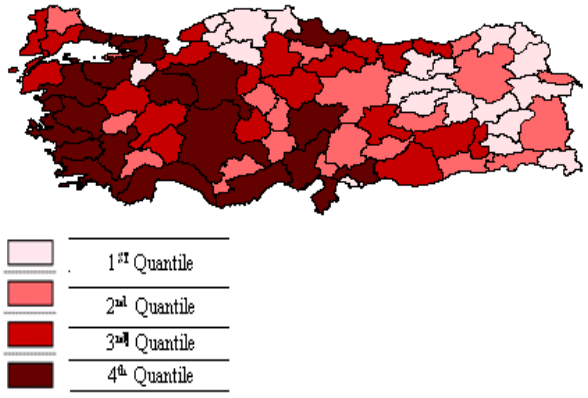
Figure 5.16: Service Sector New Firm Start-up (2006)



Sources: TURKSTAT

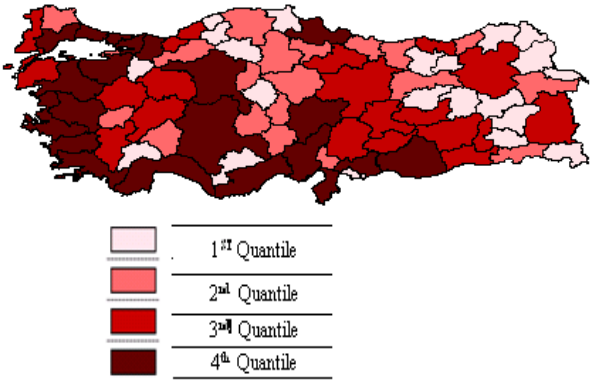
Finally same observation can be followed for trade activities by observing figures 5.17 and 5.18. In the west Bilecik is observed as an outlier both in 1997 and also in 2006 as a lagging city. Moreover Bartin, Karabuk, Cankiri and also Kastamonu are lagging cities of their regions. On the other side of the relation, Gaziantep, Sanliurfa are two important outperformers of their regions. Similar to service sector developments in 2006 the place of Van and Erzurum also underlines that these cities are outperforming their geographic locations.

Figure 5.17: Trade Sector New Firm Start-up (1997)



Sources: TURKSTAT

Figure 5.18: Trade Sector New Firm Start-up (1997)



Sources: TURKSTAT

Note that comments given on these six maps are only illustrative; a deeper understanding will be explained after examining the geographic interactions in chapter 6. Here regarding the spatial distribution of the new firm formation, a vital finding is related with the east-west structure. While a number of developments in these regions are given as examples of persistence and also some outlier behaviors at the end the majority of the urban areas gives a clear picture of this east west structure. In this sense remarks of Gezici and Hewings (2004, 2007) regarding the classification of regions with and without costal lines is found informative but not sufficient. The background reason is the lagging regions of the Blacksea, which have to be investigated more closely and should be related with the lagging regions that are forming a symmetric belt in the eastern and southeast Anatolia. In this sense, it seems that costal lines in the west and south have different implications on the regional economic activity when compared with the northern costal lines. Moreover the illustrations that give a limited insight about the distribution of economic activity across space should be carefully read. While a number of

hypotheses will be tested as to give the clues regarding the reasons of the illustrated distribution, it seems to be a necessity to carry the examination one step further towards inclusion of geography into the examination, which is actually a planned observation in the sixth chapter.

Overall this section of the chapter, while constrained with data availabilities, still gives some valuable hints about the behavior of economic activity, or one may also call as the location choice of production. In this sense, one important finding of the study is; similar to the vast literature in Turkey regarding the convergence (or divergence) of regional income, it is not possible to talk about an equal distribution of new firm start ups in Turkey. Moreover it seems that this unequal structure is also persistence over time. This clearly defined east and west structure should be observed as the reflection of the spatial patterns and the role of geography to understand why some regions are lagging with respect to others and why this inequality follows a geographic pattern. Following section will try to answer some part of these questions, by using the contemporary techniques of the literature. In a similar fashion, following chapter will carry the discussion a point further and will explain the role of geography and actually will question the observed inequity pattern (spatial) by questioning the approach of assuming spatial randomness.

5.2 Dynamics of the Location Decision of New Firm Start Ups

After observing the general patterns in Turkey, regarding the distribution of new firms, remaining question is about the background motivations of the location choice of new firms. In this sense, listed discussions of chapter 4 will be evaluated in this section. Already formed groups of demand, supply and policy side will be examined. Here to avoid possible specification biases

models will be constructed in their simplest forms and tried to be augmented towards a general aggregated one. In line with the discussions about different panel data models, all estimations procedures mentioned so far will be carried out. At the end such an approach is expected to give some room to check the robustness of the findings. At this point while the core expectation regarding the choice between fixed and random effect static panel models are in favor of the usage of fixed effect models, as debated Baltagi (2005), also Hausman specification test will be carried out to check the consistency of the efficient random effect estimator. Moreover note that for the dynamic panel estimations, system GMM estimation procedure is checked for the validity of the instruments by using the Hansen over identification test. In addition to that and AR (2) test is also essential to check for the residual autocorrelation. Note that these procedures are followed in all of the models estimated thorough out the chapter, thus will not be remarked once more.[49]

Revisiting the major groups of regional social and economical properties, observations will start by assessing the impact of regional demand on the location choice of production. As emphasized before, due to lack of regional income data, per capita tax revenues of provinces is used as a proxy to asses the demand potential of regions. Here a number of critiques can be listed. Tax revenues reported here is the aggregated personal and corporate taxes, composed of both direct and indirect taxes. In this sense, while personal tax revenues can be directly linked to regional income of individuals living in that province, corporate tax collections can be problematic. Here two concerns should be remarked. First of all existence of informal sector and unequal distribution of this sector among Turkey may cause to skip some dynamics and may cause biases. Second of all operation locations and registration locations of corporate units may be different. In this sense the concern is that, a corporate unit may be paying taxes in a location

[49] For a detailed representation of the dynamic panel estimation, see chapter 4.

which is different than the location of the real economic activity. Keeping in mind these possible problems, it is still the unique indicator to assess the demand side of the relationship.[50]

Results reported in table 5.7 clearly specify that demand potential, controlled by the per capita tax revenues of provinces is a vital determinant of the location choice of different economic activities. Note that controlling for the impact of the 2001 financial crisis makes no difference regarding this positive impact. Following the investigation of the demand side of the relationship, supply side and policy side of the mechanism are also considered. A number of supply side relationships are considered as also discussed in chapter 4. Four different education indicators as a human capital development sign, as well as deposit and credit volumes to search for the impact of financial capital will be investigated. Moreover industrial linkages will be considered by computing the new firm formation densities of urban areas. Finally regarding the policy side, public policy will tried to be questioned by using the annual regional public expenditures.

[50] See chapter 3 for the debate regarding the accuracy of tax revenues to assess regional income inequalities. Moreover one can also follow Altinbas et al. (2002) and Dogruel and Dogruel (2003) to discuss the role of tax revenues as a regional prosperity indicator. Also see chapter 6 for the discussion of using per capita tax revenues as a valid proxy to be used in the calculation of market access (potential) index.

Table 5.7: Determinants of New Firm Start-ups (Model I)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**System GMM**	**FE**	**RE**	**System GMM**	**FE**	**RE**	**System GMM**
Y (-1)	-	-	0.417* (0.043)	-	-	0.244* (0.061)	-	-	0.359* (0.032)
2001 Crisis Dummy	-0.525* (0.049)	-0.517* (0.050)	-0.342* (0.056)	-0.309* (0.053)	-0.334* (0.052)	-0.293* (0.051)	-0.262* (0.043)	-0.298* (0.047)	-0.162* (0.044)
Tax Revenues	0.559* (0.123)	0.603* (0.045)	0.490* (0.053)	0.970* (0.143)	0.756* (0.052)	0.566* (0.088)	0.786* (0.112)	0.488* (0.038)	0.311* (0.049)
Hausman Test Stat (p)	0.14 (0.93)		-	2.57 (0.28)		-	7.95 (0.02)		-
F/Wald Test (p)	95.06 (0.00)	351.40 (0.00)	180.11 (0.00)	57.81 (0.00)	281.61 (0.00)	65.33 (0.00)	60.98 (0.00)	227.87 (0.00)	126.42 (0.00)
AR(2) Test Stat (p)	-	-	-1.09 (0.276)	-	-	0.61 (0.543)	-	-	-1.26 (0.209)
Hansen Test Stat (p)	-	-	64.82 (0.109)	-	-	77.89 (0.193)	-	-	79.38 (0.163)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

Starting with the human capital development, two sets of indicators are considered at first; enrolled student numbers (relative to local population) in secondary and university education as to see the student share in the province and teacher to student ratio in secondary and university education for understanding the quality of education and also level of regional human capital development. To avoid some colinearity problems, each education indicator is injected to separate models and at the end these four models are compared as to decide the superior one. In this sense, estimated models underline that the best indicator to account for the human capital development is the quality indicator of the secondary education. For the university quality indicator, results reported in appendix for model II-B remarks that, although a positive association is detected, strength of the relationship is not as strong as it is for the secondary education measure. Moreover inclusion of other control variables also decreases the significance of the university education's quality indicator. Regarding the enrolment rates, as illustrated in the appendix, Models II-C and II-D underlines a negative impact over the new firms unlike the expectations. Note that significance of this negative relationship is also questionable. One can explain this by concentrating on the distribution of the enrollment numbers across Turkey. Karahasan and Uyar (2009), Karahasan and Lopez Bazo (2010) investigated the spatial distribution of different education indicators, remarking that a strong spatial association for student and graduate numbers in secondary education cannot be observed whereas for quality indicators, there is significant spatial interaction among the provinces of Turkey, which can somehow explain both the pulling and pushing regions of the country. Moreover possible mobility of the young labor force within the borders of the country can be another explanation. In short models and debates based on them underline that secondary education quality is an important determinant of the firms´ location choice. Here it is worth mentioning once more that, this explanation is not directly related with the expectations of Marshall (1920), rather it can be

connected with a more developmantalist perspective; regional human capital development is what affecting the location choice of new firms.

Table 5.8: Determinants of New Firm Start-ups (Model II-A)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**System GMM**	**FE**	**RE**	**System GMM**	**FE**	**RE**	**System GMM**
Y (-1)	-	-	0.369* (0.030)	-	-	0.184* (0.051)	-	-	0.353* (0.049)
2001 Dummy	-0.363* (0.047)	-0.385* (0.050)	-0.320* (0.053)	-0.193* (0.052)	-0.229* (0.053)	-0.262* (0.050)	-0.145* (0.044)	-0.225* (0.049)	-0.139* (0.047)
Tax Revenues	0.302* (0.115)	0.480* (0.044)	0.436* (0.063)	0.759* (0.138)	0.652* (0.049)	0.417* (0.081)	0.587* (0.109)	0.418* (0.037)	0.246* (0.058)
Sec. Edu. Quality	1.497* (0.137)	1.140* (0.113)	0.281* (0.098)	1.160* (0.155)	0.954* (0.126)	0.553* (0.132)	1.126* (0.134)	0.651* (0.099)	0.436** (0.209)
Hausman Test Stat (p)	20.44 (0.00)		-	7.53 (0.05)		-	45.24 (0.00)		-
F/Wald Test (p)	109.90 (0.00)	473.94 (0.00)	201.55 (0.00)	66.50 (0.00)	379.45 (0.00)	61.03 (0.00)	71.82 (0.00)	315.85 (0.00)	136.84 (0.00)
AR(2) Test Stat (p)	-	-	-1.04 (0.297)	-	-	0.72 (0.469)	-	-	-0.96 (0.336)
Hansen Test Stat (p)	-	-	78.58 (0.12)	-	-	77.00 (0.146)	-	-	79.14 (0.112)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

After observing the impact of human capital development on the firm location decisions, the following concern will be the impact of financial development. As debated in chapter 4, two measures can be considered; local deposit and credit volumes (per capita). However usage of deposit volume (even per capita) seems to be problematic. Results regarding the inclusion of the deposit volume (in per capita terms) are illustrated in appendix B. The negative significant relationship actually coincides with the previous findings of Ardic and Damar (2006) mentioning that deposit volumes and per capita income growth at the regional level are negatively associated in Turkey. Unlike Valverde et al (2003) for Spain, results for Turkey seems to deviate from the expectations of the McKinnon(1973) and Shaw (1973) type of growth theories and also Evans, Jovanovic (1987) that specifies a unique place for finance in the entrepreneurs' location choice. This can have a number of different explanations. First of all it is noteworthy to mention that deposit volume represents some fraction of the savings of a province, however as there is no local banking system, instead a national banking system in Turkey, this does not necessarily mean that savings of the individuals are the available funds for the usage of economic activity in that region. In this sense the national banking system in Turkey, unlike the one in Spain, may have a divergence between the funds' collection and usage locations. From this point of view, usage of a more informative indicator, such as credit usage within that province is found to be a more powerful and accurate way to analyze finance and location choice interaction. Model III prefers to use per capita credit volume as to specifically see the financial deepness of the provinces. Model III-A indicates that finance matters for the location choice of the producers. While injection of this financial development variable does not change the findings in the static models, findings indicate that for the dynamic models constructed for service and trade sectors, inclusion of the financial development variable cancels out the impact of secondary education's quality. Here results that are indicating the positive association between credit volumes and firms location

choices will again have two separate interpretations. This credit indicator is an aggregated measure composed of personal and corporate credit usages within that province. From this perspective, it contains both the supply side and also demand side of the relationship. While personal credit usage can be a sign of the activity level of the consumption thus demand, on the other hand usage of credit by corporate units can also be remarking the increasing activity level of the production. Here one can judge that this indicator can also be a sign of the financially weak structure of the firms (financial leverage) and their flow of funds mechanism, it seems impossible to enter this discussion by using the available data set, moreover such an approach will also be outside the scope of this ongoing discussion.

Table 5.9: Determinants of New Firm Start-ups (Model III-A)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**System GMM**	**FE**	**RE**	**System GMM**	**FE**	**RE**	**System GMM**
Y (-1)	-	-	0.351* (0.028)	-	-	0.059 (0.048)	-	-	0.336* (0.033)
2001 Dummy	-0.334* (0.048)	-0.331* (0.055)	-0.258* (0.054)	-0.083 (0.053)	-0.104*** (0.055)	-0.020 (0.05)	-0.106** (0.045)	-0.170* (0.053)	-0.062 (0.053)
Tax Revenues	0.247** (0.124)	0.402* (0.056)	0.242* (0.074)	0.513* (0.133)	0.444* (0.059)	0.271** (0.122)	0.506* (0.119)	0.333* (0.051)	0.088 (0.061)
Sec. Edu. Quality	1.412* (0.156)	0.930* (0.125)	0.188*** (0.109)	0.795* (0.163)	0.575* (0.137)	0.422 (0.291)	1.003* (0.145)	0.499* (0.107)	-0.074 (0.173)
Credit Volume	0.064 (0.047)	0.126* (0.047)	0.146* (0.046)	0.259* (0.048)	0.279* (0.048)	0.411* (0.069)	0.091** (0.037)	0.119* (0.039)	0.182* (0.060)
Hausman Test Stat (p)	22.30 (0.00)		-	6.46 (0.17)		-	25.61 (0.00)		-
F/Wald Test (p)	88.53 (0.00)	535.05 (0.00)	157.43 (0.00)	73.68 (0.00)	477.70 (0.00)	59.18 (0.00)	68.90 (0.00)	360.56 (0.00)	76.35 (0.00)
AR(2) Test Stat (p)	-	-	-0.92 (0.357)	-	-	0.62 (0.533)	-	-	-0.90 (0.366)
Hansen Test Stat (p)	-	-	79.02 (0. 113)	-	-	75.04 (0.142)	-	-	79.07 (0.130)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

After seeing two vital elements of the supply side of the relationship, to discuss the place of industrial interactions, following Marshall (1920) and also revisiting Venables (1996), impact of industries on each other is tried to be evaluated. However as mentioned before lack of industrial value added data and moreover insufficient information regarding labor structure of these industries, prevents the study to directly question the possible links between industries. As already debated in chapter 4, a density indicator is computed by using the new firm formation numbers. For three economic activities, share of each individual sector in the total new firm formation volumes are computed. In this sense, here relationship can be constructed over two separate channels. If there are somehow industrial linkages between sectors then a positive association may be the case, however it can also be the case that competition or specialization may cause firms to escape from different industries unlike the expectations of Marshall (1920). To observe the roots of this relationship in Turkey, Model IV is constructed. Simply for each economic activity, new firm shares of the other two industries are considered. While for each model other industries impact on the dependent variable are considered, to prevent statistical biases of the inclusion of the dependent variable as a density measure to the right hand side of the models, impact of those industries are not considered. Note that the possible impact of the dependent variable is already captured in the dynamic models. Overall findings reported in model 4, table 5.10, are interesting; it seems that industrial linkages are not the case for provinces of Turkey. It is evident that share of other industries new firm formation has a negative impact on each other. Moreover, similar to the majority of the models in this chapter lagged values of the dependent variable signals the pull effect of the own industries in the dynamics models. Overall these findings are very preliminary due to the usage of a density proxy, however still contains valuable information as to understand the industrial interactions.

Table 5.10: Determinants of New Firm Start-ups (Model IV)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**S-GMM**	**FE**	**RE**	**S-GMM**	**FE**	**RE**	**S-GMM**
Y (-1)	-	-	0.237* (0.056)	-	-	0.076 (0.045)	-	-	0.174* (0.051)
2001 Dummy	-0.264* (0.048)	-0.258* (0.055)	-0.159* (0.04)	-0.077* (0.052)	-0.097*** (0.055)	-0.027 (0.066)	-0.083*** (0.044)	-0.142* (0.052)	-0.009 (0.060)
Tax Revenues	0.312** (0.127)	0.458* (0.056)	0.471* (0.087)	0.506* (0.125)	0.463* (0.059)	0.327* (0.096)	0.538* (0.115)	0.391* (0.052)	0.298* (0.105)
Sec. Edu. Quality	1.391* (0.156)	0.925* (0.125)	0.490*** (0.279)	0.831* (0.167)	0.597* (0.139)	0.529** (0.266)	0.972* (0.152)	0.483* (0.112)	0.085 (0.168)
Credit Volume	0.074 (0.046)	0.135* (0.048)	0.117*** (0.065)	0.257* (0.048)	0.277* (0.048)	0.296* (0.061)	0.123* (0.039)	0.159* (0.042)	0.330* (0.061)
Density Man.	-	-	-	-0.216* (0.063)	-0.235* (0.056)	-0.533* (0.123)	-0.123** (0.057)	-0.172* (0.052)	-0.553* (0.097)
Density Services	-0.398* (0.046)	-0.387* (0.046)	-0.256* (0.057)	-	-	-	-0.369* (0.044)	-0.369* (0.046)	-0.889* (0.099)
Density Trade	-0.352* (0.137)	-0.372* (0.131)	-0.588* (0.142)	-0.315* (0.124)	-0.340* (0.123)	-0.968* (0.317)	-	-	-
Hausman Test (p)	194.20 (0.00)		-	8.21 (0.22)		-	30.31 (0.00)		-
F/Wald Test (p)	78.54 (0.00)	658.48 (0.00)	65.72 (0.00)	65.02 (0.00)	634.74 (0.00)	60.48 (0.00)	56.29 (0.00)	447.23 (0.00)	47.00 (0.00)
AR(2) Test Stat (p)	-	-	-0.12 (0.906)	-	-	1.10 (0.271)	-	-	0.49 (0.627)
Hansen Test (p)	-	-	61.51 (0.108)	-	-	72.70 (0.166)	-	-	73.52 (0.171)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

Finally after capturing a number of supply side relationships, final attention is directed towards the role of public policy. By doing so the aggregated model will be constructed and actually at the end overall discussion will be done over this aggregated model. Here the preferred measure is the per capita public expenditures of provinces. Note that this data contains all of the regional public expenses ranging from infrastructure expenses to payments done to workers in the public sector, as well as different investments done to different social and public services. Hence this is an aggregated measure explaining the dynamism of the public side of the economy and can also be regarded as a demand side variable. If it was possible to decompose this indicator, usage of infrastructure investment expenses or investment expenses done to social and public services may help the study to directly consider the policy side of the relationship. Results are reported in Model V-A in table 5.11. Here to check for the robustness, two additional models are estimated and reported in appendix as Model V-B and Model V-C. Model V-B does not use industry density measures to see the robustness of the public policy indicator; meanwhile Model V-C is testing the validity of using the density indicators by keeping all other control variables outside. By doing so possible interrelations between density measures and the control variables are tried to be accounted for. For Modal V-A, based on the results of the dynamic models, it can be interpreted that public expenditures is not a significant determinant of the firm location choice. Moreover the model is observed to stable and robust in the sense that other control variables results are almost persistent. When we move towards Model V-B, public expenditure is found the insignificant in all of the dynamic models done for three economic activities. Just for the static model constructed for the services, one can detect a limited significant positive impact of the public policy on the firms' location choice. As a final step if Model V-C is overviewed, it seems to be apparent that industry density indicators are negatively and significantly affecting the firm formation process, so their inclusion to the models is a necessity.

To generalize the overall findings over the aggregated model, Model V-A, demand side of the relationship is found to be an important part of the firms' location choice regardless of the estimation technique carried out. This is in line with the expectations of the Krugman (1991a, b, c) and various empirical studies mentioned in the chapter 2. 2001 financial crisis impact on the entrepreneurship behavior is found to be strongest for the manufacturing industry. However for services industry aggregated model points out the lack of any significant connection. Finally for the trade sector activities, findings indicate a relationship for the static models but not for the dynamic models. Education quality as a regional human capital development indicator has its strongest impact for the service sector, regardless of the estimation procedure. For manufacturing and trade industries although results underline a significant positive relationship for the static models, dynamic models can not give similar results. However note that education quality indicator is found to be significant for manufacturing in Model IV. For the financial development indicator, per capita credit volume, regardless of the industry and also the estimation procedure, results highlights the positive and significant effect of financial development (deepening) on the firms' location choice. This is again a strong finding supporting both the McKinnon (1973) and Shaw (1973) type of growth models and also Evans and Jovanovic's (1989) concerns regarding the need for the funding and financing of entrepreneurs. As mentioned above, effect of the public policy is ambiguous. As the public policy indictor is an aggregated one and as it is not possible to decompose this indictor, the relationship contains not only the public policy side but also some demand side impacts. Overall free from the estimation procedure and for all three economic activities under concerns, results underline the lack of connection between public expenditure and the firms' location choice. Finally regarding the industrial interconnections, results clearly suggest that firm formation behavior, thus the location choice of production for different economic activities, is in the mood of specialization. Industries tend to locate close to the

economic activities at the same (or similar) areas. Instead of complementarities in this sense, location choice of the production has two consequences. One is the revisited specialization issue and the other one is regarding the substitution of industries to each other in different localities. In short findings, which are validated by the Model V-C in appendix, remarks that firms tend to locate close to firms specializing in similar business activities.

All models listed here and also a number of models mentioned in the appendix aim to give an insight about the impacts of the major social and economic properties of the provinces in Turkey, over the location choice process of firms belonging to three major economic activities. Here an important finding about these models is that, a clear cut between sectors can not be interpreted. While the descriptive approach carried out in the section 5.1 underlines that dispersion of the firm formation has minor differences when we move from manufacturing towards trade sector, at the end the major conclusion created here is that firm start ups, thus the location choice, is mainly affected by the common properties of the provinces in Turkey. And these impacts are also much or less common for the three economic activities under concern. Moreover, while the data limitation prevents the study to construct a model to capture all of the theoretical backgrounds of the firm location choice, it is still possible to give some insight about possible ways to approach the location choice decision in Turkey.

Table 5.11: Determinants of New Firm Start-ups (Model V-A)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**System GMM**	**FE**	**RE**	**System GMM**	**FE**	**RE**	**System GMM**
Y (-1)	-	-	0.249* (0.062)	-	-	0.074 (0.046)	-	-	0.157* (0.056)
2001 Dummy	-0.274* (0.050)	-0.289* (0.056)	-0.130** (0.061)	-0.055 (0.052)	-0.083 (0.056)	-0.016 (0.066)	-0.082*** (0.045)	-0.135** (0.052)	-0.039 (0.069)
Tax Revenues	0.334** (0.133)	0.469* (0.055)	0.416* (0.085)	0.458* (0.129)	0.455* (0.059)	0.328* (0.096)	0.535* (0.120)	0.389* (0.051)	0.304* (0.109)
Sec. Edu. Quality	1.389* (0.156)	0.899* (0.123)	0.043 (0.149)	0.836* (0.164)	0.596* (0.138)	0.545** (0.263)	0.972* (0.151)	0.486* (0.112)	0.096 (0.178)
Credit Volume	0.0813*** (0.046)	0.151* (0.048)	0.201* (0.059)	0.241* (0.049)	0.269* (0.049)	0.285* (0.073)	0.121* (0.039)	0.157* (0.042)	0.369* (0.069)
Public Expenditures	-0.109 (0.129)	-0.255* (0.098)	0.003 (0.243)	0.240*** (0.126)	0.121 (0.099)	0.072 (0.216)	0.018 (0.120)	0.044 (0.079)	-0.243 (0.211)
Density Man.	-	-	-	-0.208* (0.063)	-0.224* (0.057)	-0.516* (0.118)	-0.123** (0.056)	-0.165* (0.053)	-0.640* (0.112)
Density Services	-0.394* (0.046)	-0.381* (0.046)	-0.252* (0.058)	-	-	-	-0.370* (0.044)	-0.369* (0.045)	-0.939* (0.110)
Density Trade	-0.352** (0.138)	-0.376* (0.131)	-0.656* (0.137)	-0.310** (0.123)	-0.335* (0.122)	-0.982* (0.329)	-	-	-
Hausman Test (p)	43.26 (0.00)		-	8.79 (0.27)		-	31.84 (0.00)		-
F/Wald Test (p)	67.99 (0.00)	671.79 (0.00)	67.15 (0.00)	64.01 (0.00)	661.44 (0.00)	53.12 (0.00)	50.43 (0.00)	457.29 (0.00)	43.31 (0.00)
AR(2) Test Stat (p)	-	-	-0.35 (0.727)	-	-	1.14 (0.253)	-	-	0.32 (0.748)
Hansen Test (p)	-	-	61.12 (0.115)	-	-	72.77 (0.144)	-	-	72.40 (0.172)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

After understanding the major determinants of the new firms' location choice process, based on the previous remarks of section 5.1, the aggregated model and major comments done based on that model will tried to be questioned. Revisiting the dispersion of new formation across the NUTS 1 regions of Turkey demonstrates an environment, in which Istanbul by itself captures most of the new firms in Turkey. For manufacturing industry Istanbul captures approximately five times the Turkey averages. Same figure is between 4 and 7 for services and between 3 and 5 for the trade activities. In this sense seeing that other NUTS 1 regions never exceeds two times the Turkey averages and knowing that other NUTS 1 regions all contain more than one province, Istanbul by itself acts as an important outlier province in Turkey. This may cause some dynamics of the process to be affected by the special characteristic of Istanbul and the major centripetal and centrifugal forces of Istanbul. To clarify the previous findings regarding the determinants of firm location choice and also to see the possible different dimensions of keeping Istanbul out of sample, the aggregated model, Model V-A, V-B and V-C are estimated without Istanbul this time.

Model V-B and Model V-C are the robustness check as usual and reported in the appendix B. Here findings reported in Model V-A highlights that, although Istanbul is a divergent province with respect to Turkey averages, even keeping Istanbul out of the sample does not change the major findings of the models. Again strongest relationship seems to be running from the demand side and also the financial development of provinces. Moreover impact of regional human capital development and also industry densities' impacts are again similar to the previous findings. In short, patterns detected previously are still persistent even when Istanbul is kept out of the models.

Table 5.12: Determinants of New Firm Start-ups, Excluding Istanbul (Model VI-A)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**System GMM**	**FE**	**RE**	**System GMM**	**FE**	**RE**	**System GMM**
Y (-1)	-	-	0.246* (0.063)	-	-	0.077*** (0.045)	-	-	0.167* (0.057)
2001 Dummy	-0.277* (0.051)	-0.297* (0.057)	-0.136** (0.061)	-0.054 (0.053)	-0.086 (0.056)	-0.023 (0.068)	-0.083* (0.046)	-.0140* (0.054)	-0.058 (0.071)
Tax Revenues	0.338** (0.135)	0.437* (0.055)	0.406* (0.083)	0.457* (0.129)	0.437* (0.061)	0.307* (0.096)	0.536* (0.120)	0.371* (0.053)	0.279** (0.111)
Sec. Edu. Quality	1.404* (0.160)	0.936* (0.125)	0.054 (0.151)	0.842* (0.167)	0.615* (0.142)	0.605** (0.267)	0.9838 (0.155)	0.508* (0.115)	0.167 (0.187)
Credit Volume	0.080*** (0.046)	0.143* (0.048)	0.205* (0.059)	0.239* (0.049)	0.266* (0.050)	0.262* (0.071)	0.121* (0.039)	0.151* (0.043)	0.339* (0.076)
Public Expenditures	-0.128 (0.133)	-0.250** (0.099)	-0.028 (0.233)	0.246*** (0.132)	0.129 (0.101)	0.073 (0.207)	0.015 (0.125)	0.051 (0.080)	-0.269 (0.205)
Density Man.	-	-	-	-0.209** (0.064)	-0.228* (0.058)	-0.543* (0.123)	-0.125** (0.057)	-0.172* (0.053)	-0.648* (0.110)
Density Services	-0.390* (0.046)	-0.375* (0.046)	-0.253* (0.056)	-	-	-	-0.369* (0.044)	-0.367* (0.046)	-0.905* (0.113)
Density Trade	-0.353* (0.139)	-0.369* (0.131)	-0.654* (0.138)	-0.311* (0.124)	-0.335 (0.122)	-1.051* (0.331)	-	-	-
Hausman Test (p)	35.52 (0.00)		-	8.24 (0.31)		-	31.53 (0.00)		-
F/Wald Test (p)	66.77 (0.00)	634.91 (0.00)	68.61 (0.00)	63.88 (0.00)	617.15 (0.00)	48.70 (0.00)	50.12 (0.00)	423.17 (0.00)	40.52 (0.00)
AR(2) Test Stat (p)	-	-	-0.39 (0.697)	-	-	1.08 (0.280)	-	-	0.17 (0.867)
Hansen Test (p)	-	-	60.76 (0.121)	-	-	71.20 (0.175)	-	-	72.08 (0.179)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

6. Spatial Autocorrelation and Role of Geography on Regional Firm Formation in Turkey

Discussion constructed up to this chapter, evaluates models aiming to explain the association between regional firm formation and regional social and economical properties by assuming spatial randomness. What is meant by spatial randomness is that, provinces locating close to each other have no influence on each other in the form of any spatial association. However as emphasized by Anselin (1995) and also later applied by numerous studies, local patterns may cause the rise of spatial autocorrelation among the investigated regional areas. In this context evaluation of spatial randomness against spatial autocorrelation is found to be a compulsory analysis as to check the validity of the previous models demonstrated with the assumption of spatial randomness. In case spatial dependency or association is detected, the study should be diverted towards the usage of cross section data and panel data models dealing with spatial interrelation. In this setting two major spatial models can be preferred; spatial auto regressive models (SAR) assumes that spatial dependence works through the dependent variable, spatial error models (SEM) proposes that spatial association is contained in the omitted variables.[51]

In fact such a process may yield valuable information regarding the neighborhooding effects which is most of the time neglected by regional and urban studies. Especially for countries like Turkey, investigation of these local patterns is much more interesting hence; it

[51] See Anselin (2001, 2009) for a detailed representation of the spatially dependent panel models. Also see Tselios (2008) and Bazo et al. (2009) for specific applications of spatial and non spatial panel models.

may give profound understanding for evaluating the background of lagging regions and possible clusters. As summarized in chapter 3, in the knowledge of the ongoing study just a limited number of studies deal with spatial issues in Turkey. It was first Gezici and Hewings (2002, 2004, and 2007) to discuss and compare regional inequalities with regional spatial dependency, remarking the increasing spatial association. Meanwhile Yıldırım and Öcal (2006) and Aldan and Gaygisiz (2006) both underline the need for using spatial models to discuss the regional income convergence in Turkey. While these studies open up a valuable debate in Turkey, they concentrate on the dependency of regional income levels. In a more recent study, from a different perspective, Karahasan and Uyar (2009) investigate the spatial dependency of education inequalities, discussing the increasing spatial association of education quality especially among the lagging urban areas in Turkey. Similarly Filiztekin (2009b) examines the regional unemployment in Turkey by taking into account possible spatial autocorrelations. From these points of views, diverting the debate towards the social and economical properties of regions is informative. Furthermore investigation of spatial relationships from other perspectives seems to be necessity as to develop different frameworks for regional development investigations.

Originating from these debates it is noteworthy to implement a similar framework for the distribution of economic activity in Turkey; hence such an approach has not been carried out previously. This chapter will fill the gap in the literature; first the most appropriate measures to evaluate the spatial autocorrelation and moreover to decompose this measure will be explained. Next preliminary findings regarding the spatial interactions and possible decomposed parts of the process will be lied down. Based on these results debate will be carried towards an understanding to measure the geographic proximity of regions in Turkey by introducing the market access index and its spatial dispersion. Finally the chapter will end

with the discussion of the relationship between geographic proximity of regions and regional firm formation of Turkey.

6.1 Measuring and Decomposing Spatial Autocorrelation

Even as the investigation of spatial association is not a lately emerging issue in the economics literature, usage of spatial autocorrelation conceptually is first done by Cliff and Ord (1969), who contributes to the existence knowledge coming from Moran (1948, 1950) regarding the spatial correlation (Getis, 2008). Actually the investigation of the spatial patterns in data sets can be connected to seminal contribution of Decay (1968). Through out the growing debate of geographic patterns and spatial relationships, a number of different measures are regarded as to identify the possible links; Moran's *I*, Geary's c, Getis and Ord's G, Ripley's K, Getis and Ord's G_i and G_i^* , Anselin's LISA, Ord and Getis's O, Matheron's $1/\gamma$ (Getis, 2008: 298).

Based on the listed indicators, more contemporary concern of spatial econometrics moves towards the differentiation of the global autocorrelation and its possible decompositions. As discussed by Anselin (1993a, b) and recently debated by Getis (2008) identification of clusters and outliers in a spatial analysis is informative as to understand the roots of the global spatial autocorrelation. Before entering the roots of the debate its worth remembering the origins. In this sense, origins of this discussion are connected to spatial autocorrelation and spatial heterogeneity debates that somehow try to identify the distinction between global and local patterns of spatial autocorrelation (Anselin, 1993a, 1993b). Anselin (1993a) criticizes traditional Exploratory Data Analysis (EDA) developed by Tukey (1977) due to lack of spatial explanations in the method. As augmented by Anselin and Getis (1992)

and used commonly in the recent spatial analysis, Exploratory Spatial Data Analysis (ESDA) acts as the right tool to determine the spatial interactions.[52]

In this setting two specific issues of spatial data should be remarked once again; (i) spatial dependency, (ii) spatial heterogeneity. In such a framework spatial dependency among regions can be identified or observed in great details by following spatial autocorrelation measures, which will be discussed shortly. However as also debated by Getis (2008) and also mentioned by Fotheringham (2009) spatial heterogeneity acts as a vital element to identify local patterns in the spatial data. Hence, it is an important contribution to observe non-stationarity of spatial data as to somehow question the major heterogeneity among the regions under investigation. In this context, following sub sections aim to define two major spatial autocorrelation measures. First the traditional and most commonly used indicators of Moran's *I* will be introduced as to account for identification of global spatial autocorrelation (Moran, 1948, 1950). Next decomposition of this indicator will be discussed by the so called Local Indicator of Spatial Association (LISA), constructed by Anselin (1995). Note that other possible measures to account for the spatial association will not be discussed for the sake of simplicity.

6.1.1 Global Spatial Autocorrelation – Moran´s *I* –

Anselin (1993a) revisits Cliff and Ord (1969) and remarks that Moran's (1948) approach can be useful to understand the global spatial autocorrelation. As it is well known, the statistic lies between -1 and +1 indicating positive and negative spatial autocorrelation. In case of the detection of positive autocorrelation, there represents locational similarities and

[52] Cited by Anselin (1993b).

related values of the variables are clustered together across space (Cliff and Ord, 1981). Moran's *I* to asses the global spatial autocorrelation can be defined as in equation 6.1. Here *n* represents the number of regions, provinces in this case; *z*'s represents the deviation of firm formation number from its own mean for each province. *W* is the weight matrix and finally *s* is the summation of all elements in the weight matrix. Weight matrix *(nxn)* is equal to 1 if *i* and *j* are neighbors and 0 otherwise.

In this setting construction of the weight matrix is crucial. Here contiguity and distance weight matrices are considered. For contiguity weight matrix rooks, bishop, Queens's (King's) are the common considerations. While bishop is rarely used, rook computes common boundaries and queen's computes both the common boundaries and also nodes. For the distance weights, a threshold distance is determined for the minimum distance between two points to be considered as neighbors. Moreover distance weight matrix can be constructed by determining a cut off point based on the k-nearest provinces.[53]

$$[6.1] \quad I_i = \frac{n}{s} \frac{\sum_i \sum_j w_{ij} z_i z_j}{\sum z_i^2}$$

This indicator can give a general understanding regarding the spatial autocorrelation of the regions by assuming spatial stability hence is informative to understand the spatial dependence. However possible variation in the data makes such an indicator a poor indicator to assess local patterns. Anselin (1993b) remarks that such a global measure will fail to

[53] See Tselios (2008) for an implementation of different forms of distance weight matrices.

explain, outliers and spatial regimes at the local level; especially if the cross section number is high.

6.1.2 Local Indicator of Spatial Association (LISA)

In the understanding of global spatial association, while overall or global spatial autocorrelation is investigated, identification of the background of the association is not possible. As explained by Anselin (1995) local patterns of the association are neglected in such a framework. Anselin (1993b, 1995) emphasizes that in case a large number of spatial units are investigated, the assumptions of stationarity and also structural stability of the global statistics becomes unrealistic. In such a setting, Exploratory Spatial Data Analysis (ESDA) offered by Anselin (1993b) following the Moran's *I* statistic and the augmentations of Cliff and Ord (1981), can be modified by the incorporation of measures that aims to decompose the global statistics. Anselin (1995) mentions that concentration towards local patterns of the association, what one may also call as hot spots, calls for allowance of local instabilities. In this context outcome of such a perspective is expected to yield two valuable insights; (i) Similar to previous explanations of Getis and Ord (1992), spatial clustering of local units around an individual location can be identified, (ii) Similar to Moran's scatter plot approach of Anselin (1993b), spatial non stationarity and spatial outliers can be detected.

In this context, Anselin (1995) explains the local indicator of spatial association (LISA) as one of the dominant measures to cope with these concerns. In fact local indicator of spatial association (LISA) definition has two major components (Anselin, 1995). First of all LISA provides some room to identify the possible significant spatial clusters as well as outliers by decomposing the global spatial autocorrelation measure. Second of all at the end,

the sum of all LISAs for all observations is proportional to the global indicator of spatial association. In such a setting positive and significant LISA measures represents the clusters of the observed relationship whereas detection of significant and negative LISA measures indentifies the outliers (Anselin, 1995). Local clusters, hot spots, are what one can call as the areas with contiguous locations for which LISA measures are significant (Anselin, 1995: 3). Note that two different types of clusters are expected to prevail; with low values clustered together and high values clustered together. On the other hand instabilities representing outliers are actually deviation of the individual observation from the global statistics. In this case outliers can be detected that somehow remark differentiated results with respect to the global statistic. Equation 6.2 is the transformed local Moran statistic. Note that summation of all local Moran's sum up to Moran's *I*.

[6.2] $$I_i = z_i \sum_j w_{ij} z_j$$

One of the most striking problems regarding the LISA measure is related with the identification of the significance of the indicator. Actually Anselin (1993b, 1995) discussed these issues in great details, remarking that solution out of the possible significance determinations lies in the conditional randomization or permutation approach. It is the importance of investigation of the individual LISA measures that contributes to spatial autocorrelation issue. In this setting; O'Loughln et al. (1993) underline that significant global autocorrelation measure hides numerous local patterns of clustering as well as spatial randomness. On the other hand while, global autocorrelation shows no sign of significance, it

may be the case that local patters indicate existence of local spatial association (Anselin, 1995).

6.2 Global Spatial Autocorrelation of Firm Formation in Turkey

Based on the ongoing discussion, preliminary analysis aims to investigate the spatial autocorrelation for Turkey, by concentrating on three major economic activities; manufacturing, services and trade. Results represented in table 6.1 are the Moran´s *I* statistics computed based on two different weight matrices for all economic activities under concern. For queen contiguity weight matrices order of contiguity is determined as 1 and 2 respectively. Moreover for the second set of calculations, distance weight matrix for nearest 4^{th} and 5^{th} neighbors as cut off points is computed separately. To test the significance of the statistics, standard errors are computed based on randomization for 999 permutations, as offered by Anselin (1995).

Findings indicate the presence of a spatial interaction among the urban areas of Turkey in terms of new firm start ups. Although the value of the spatial global autocorrelation never exceeds a threshold value of 0.3460, it is noteworthy to consider the spatial relationship of provinces' firm start up behaviors. Overall the observed pattern seems to be highest and most persistent among the manufacturing industry. Another vital finding is regarding the sharp decline in the spatial interaction during the crisis years of 1999-2001, especially for services and trade industries.

In this context one can think of (and/or question) the presence of clusters that effect formation of new firms. A rising firm formation potential of an urban area may be affected by

or may be affecting its surrounding, while the reverse can also be the case. However preliminary findings can give the details regarding the magnitude and also the extent of the spatial association at the local level. As mentioned previously such a perspective to account for the geographic interrelations have not been carried out yet. Hence the study finds it vital to point out that a new approach towards injections of geography in the proposed models can be informative. However as to be more specific and also as to understand the background of the global spatial autocorrelation measure, identification of the local units seems to be a necessity. In line with the concerns revisited in the previous sub section, decomposition of this spatial autocorrelation is noteworthy. By doing so, debate can be augmented towards the identification of the clusters and other patterns between the provinces of Turkey.

Table 6.1: Moran´s *I* Statistics for Three Economic Activities in Turkey (NUTS 3)

Quenn Weight Matrix (n = order of contiguity)		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Manufacturing	n=1	0.1891*	0.1270**	0.0505**	0.0393	0.1618**	0.1618**	0.1584**	0.1977*	0.2030*	0.3249*
	n=2	0.2676*	0.1842*	0.1014**	0.1082**	0.1925**	0.1917*	0.2126*	0.2454*	0.1862*	0.2937*
Services	n=1	0.2450*	0.2063*	0.0710***	0.1340**	0.1288**	0.1289**	0.1686**	0.1653**	0.2076*	0.2462*
	n=2	0.1662*	0.1028**	0.0587***	0.0719***	0.1096**	0.0825**	0.1246**	0.0953**	0.1244**	0.1493*
Trade	n=1	0.2920*	0.1170**	0.0526	0.2425*	0.0477	0.0670	0.2152*	0.1061**	0.1207**	0.2368*
	n=2	0.2244*	0.0963**	0.0761**	0.0019	0.1120**	0.1030**	0.2061*	0.1203*	0.1501*	0.2558*
kth nearest Matrix (k= # of neighbours)		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Manufacturing	k=4	0.2491*	0.2136*	0.1241**	0.1129**	0.2325*	0.1943*	0.2515*	0.2402*	0.2408*	0.3796*
	k=5	0.2261*	0.1897*	0.1075**	0.0987**	0.2048*	0.1851*	0.2345*	0.2441*	0.2250*	0.3618*
Services	k=4	0.1368**	0.984***	0.0591	0.1090***	0.0691	0.0712	0.0857***	0.0640	0.1047***	0.1838**
	k=5	0.1945*	0.1589**	0.0851***	0.1320**	0.1041***	0.1141**	0.1314**	0.1266**	0.1636**	0.2263*
Trade	k=4	0.2019*	0.0965***	0.0956***	0.0845***	0.0413	0.0916***	0.2218*	0.0885***	0.1275**	0.2324*
	k=5	0.2010*	0.1036**	0.0988**	0.1291**	0.0407	0.0895***	0.2148*	0.1012**	0.1156**	0.2438*

Source: TURKSTAT, author's own calculations

*, **, *** represents significance at 1%, 5% and 10% respectively

6.3 Local Indicator of Spatial Association (LISA) Analysis of Firm Formation in Turkey

The global spatial auto correlation calculations indicate that although significant associations are obtained for the sample period under concern, the value of the spatial interaction seems to be low. While such a representation is essential within the framework of spatial analysis, it fails to take into account the roots of this interaction. Hence major clusters or possible outliers can not be investigated (Anselin, 1993b, 1995, Getis, 2008). Originating from this fact, with the help of local indicator of spatial association, the global spatial autocorrelation in Turkey is decomposed into four major groups. For the identified positive spatial association two possible clusters are proposed; HH (high-high cluster) indicates the regions with high firm formation measures surrounded by again high firm formation provinces and LL (low-low cluster) explains lagging regions in terms of new firm formation in the same manner. On the other hand two possible set of outliers are listed; LH (low-high outliers) are the regions realizing low firm formation surrounded with high firm formation areas and HL (high-low outliers) acts as the regions with high firm formation measures that are around areas with low form formation realizations. Such a framework will not only decompose the global spatial autocorrelation of firm formation in Turkey, but also will shed light on the necessity of possible spatial econometric models that rejects the spatial randomness of the usual cross section and panel data analysis.

For simplicity for three economic activities LISA maps will be plotted for 1997 and 2006. HH and LL clusters are iillustrated by red and blue regions, whereas LH and HL are purple and pink illustrations respectively. For the six maps illustrated in this sub section, a specific east and west pattern is realized. Here an important finding is the size of the positive

firm formation clusters. Only a limited number of provinces formed such clusters. However clusters composed of lagging urban areas of Turkey formed persistent firm formation groups in the Eastern and South East Anatolia. Such decomposition is important as to understand the significance of the global statistics at the local level. Moreover 1997 and 2006 comparison pin points that other than manufacturing industry, for service and trade economic activities, spatial dependency on the west among the high firm formation areas are decreasing, whereas for the east the lagging firm formation pattern is persistent for the 10 year period of the analysis.

While a general insight regarding the spatial association at the local level can be captured based on the LISA illustrations, explaining the general background of this patterns seems to be a vital contribution to regional development concerns in Turkey. It can be argued that the constructed association follows the general regional inequality pattern in Turkey. However what more important here is related with the general structure of the regions. It is an important finding that diseconomies realized in the Eastern and South East Anatolia represents an important centrifugal effect for the production in Turkey. Note that both the remarks of the previous chapter and also discussion that is planned to be followed in the following sub section are parallel with the high spatial dependency observed among the less developed urban areas in Turkey. However these local spatial dependencies when observed at the country level, a spatial heterogeneity structure can also be identified. Hence it may be more convenient to follow the LISA illustrations by taking into account the level of development of provinces in Turkey. The reason is that, due to data availabilities most of the social and economical properties of the regions in Turkey can not be taken into account in the constructed panel data models. In this perspective findings evaluated here are both informative but also complementary to the general idea tried to be constructed through out the

dissertation. In short while it is not possible to name most of the dynamics behind the centrifugal forces demonstrated here, one can discuss that the problems and concerns are common in the less developed part of Turkey.

Figure 6.1: LISA Map for Manufacturing 1997

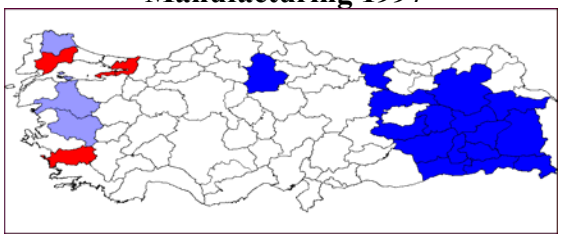


Figure 6.2: LISA Map for Manufacturing 2006

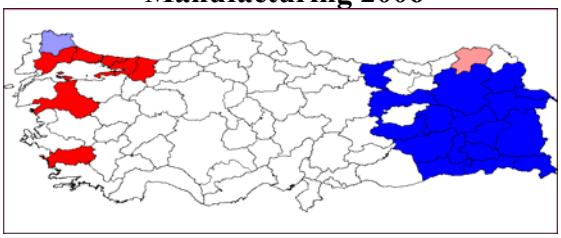


Figure 6.3: LISA Map for Services 1997

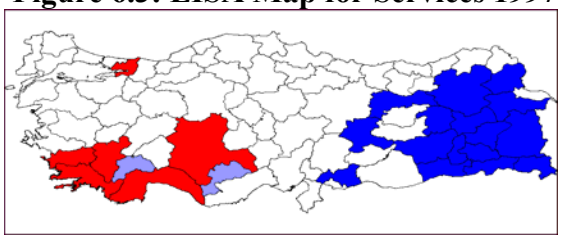


Figure 6.4: LISA Map for Services 2006

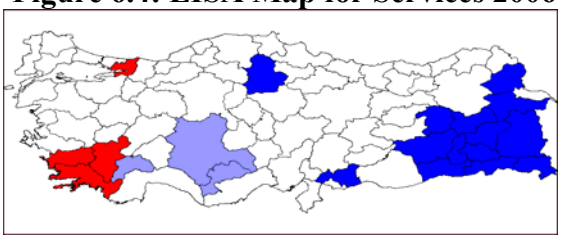


Figure 6.5: LISA Map for Trade 1997

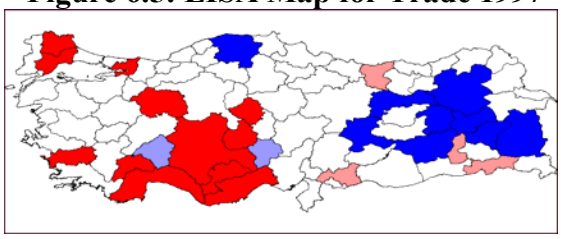
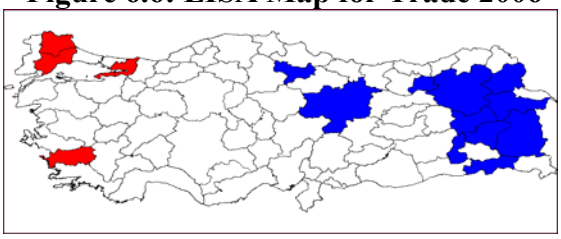
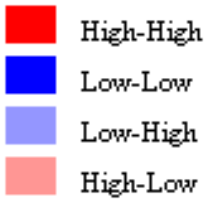


Figure 6.6: LISA Map for Trade 2006





Source: TURKSTAT, author's calculations

Illustrations from figures 6.1 to 6.6 are important as to carry out the ongoing debate a step forward. The significant global spatial autocorrelation measures reported before and especially decomposition of the LISA gives a general insight regarding the importance of

space in the central research question, thus location choice of production. However the pattern remarks that provinces and their regional grouping across space make geography's role more dominant with respect to spatial association. Taking into account the low significance of Moran's *I* and the LISA findings reported above, this section offers an alternative way to incorporate with geography of firm formation instead of construction of spatial econometric models.

6.4 Locked in Regions of Turkey and Role of Geography

As observed in the previous sub sections, spatial association matters especially in the eastern provinces of Turkey. While global spatial autocorrelation values are significant, the strength of the relationship is observed to be weak. However the complementary LISA analysis indicates that Eastern Anatolia and South East Anatolia form persistent clusters composed of lagging provinces having geographic impact on each other.

This general illustration can be connected to recent remarks of Fujita et al. (2001) that revisits the market potential approach of Harris (1954).[54] While Krugman (1992) criticizes the approach due to lack of microeconomic foundations, it is a suitable application, in case one concerns about the geographic proximity of regions in terms of locked in territories. Here approach of Harris (1954) enters the realm of regional economist investigating the regional dispersion of human capital (Redding and Schott, 2003). The constructed hypothesis that regions with higher market access realizes increasing human capital accumulation is later tested by Redding and Venables (2004), Breinlich (2006) and

[54] Harris (1954) formulizes the market potential of a region based on a function. $MA_i = \sum_k Y_j g(D_{ik})$. Market access (MA) of a region is positively related with the income levels (Y) of the remaining regions but negatively related with the distance (D) between other regions.

Rodriguez et al. (2007) all remarking the positive relationship. It is here worth mentioning that using market access index or using distance to specific economic centers do no change the result that, geography matters to understand the regional inequalities in the EU area. Meanwhile Combes et al. (2008) revisits Harris (1954) and underlines that location choice of producers is directly tied to demand; it is reasonable to determine a location for production in relatively higher MA areas.

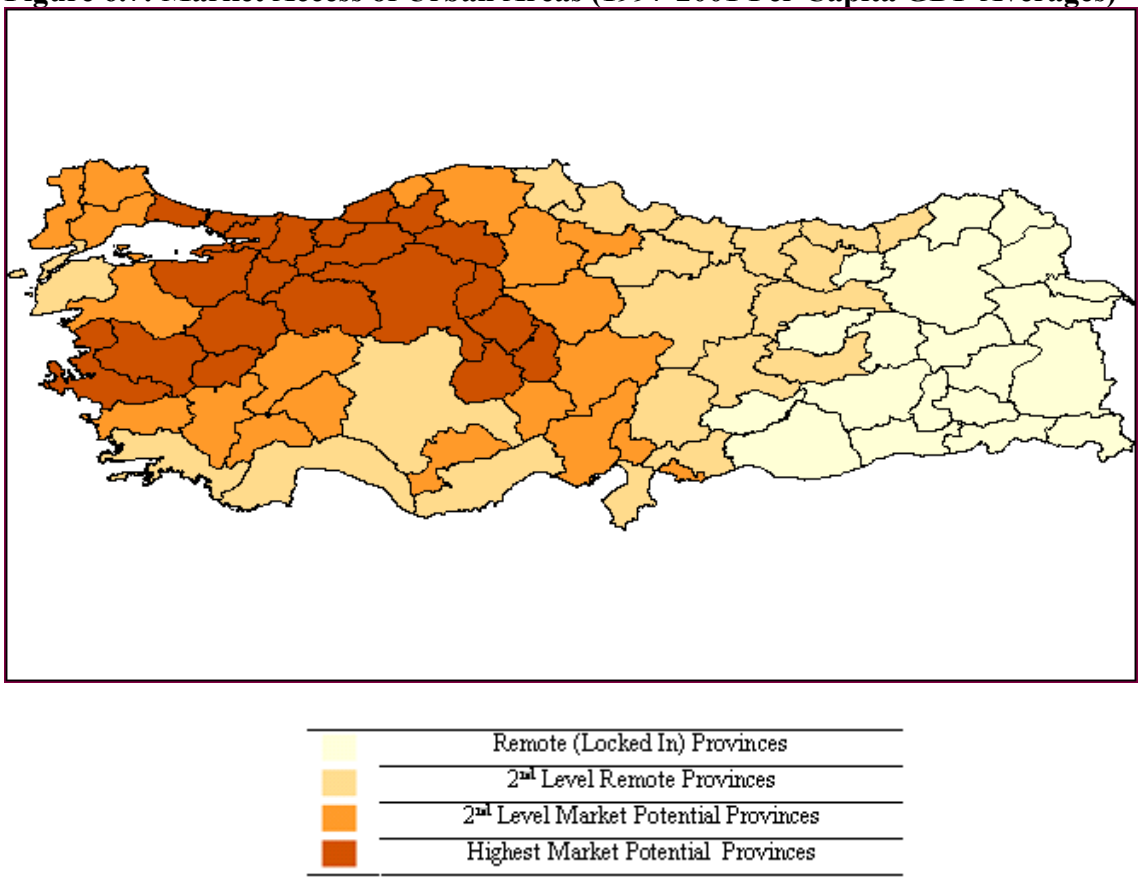
Originating from this theoretical debate, preliminary findings regarding the Eastern and South East Anatolia motivate the study to observe the market potential of provinces with special attention on the provinces that belong to the identified clusters of the LISA analyzes. Overall role of geography, in the form of accessing to high demand or high income areas will try to be evaluated. In such a setting a market access (or potential) index is aimed to be constructed, which is expected to shed light on the regional distribution of economic activity in Turkey. Market access of urban areas will be calculated as illustrated in equation 6.3. MA_i indicates the market access of region i, Y_j represents the per capita income level of region j. T_{ij} representing the transportation costs is the distance between region i and region j. Note that in case $i=j$ then $0.66x\sqrt{\frac{Area_i}{\Pi}}$ will be used to compute the distance between the two points of the circular surroundings of an urban area (Head and Mayer, 2002). In such a setting as emphasized by Harris (1954), regional income levels will be weighted by the distance, which in turn yield valuable information regarding the market access of the investigated areas.

[6.3] $$MA_i = \sum_{j=1}^{K} \frac{Y_j}{T_{ij}}$$

Here it is difficult to directly apply the approach to Turkey as per capita income at province level is not available for the post 2001 period, two approaches are followed to understand the market potentials. First per capita income data up to 2001 is used to asses the market access; next to have a more contemporary understanding regarding the market potentials, which can also later be used by the empirical model, per capita real tax revenues are used to asses the market potentials of the urban areas under investigation.[55] Figures 6.7 and 6.8 give the average market access picture for Turkey based on per capita income and per capita tax collections respectively. Both figures indicate a clear west and east structure which can also be regarded as locked in property of the Eastern and South East Anatolia, knowing the limited trade opportunities of the region also with the Eastern neighbor countries of Turkey.[56] These findings when combined with the LISA figures raise additional concerns about the role of geography in understanding the regional distribution of firm formation. Hence following sub sections aims to deal with these issues by using a very contemporary approach offered by New Economic Geographers.

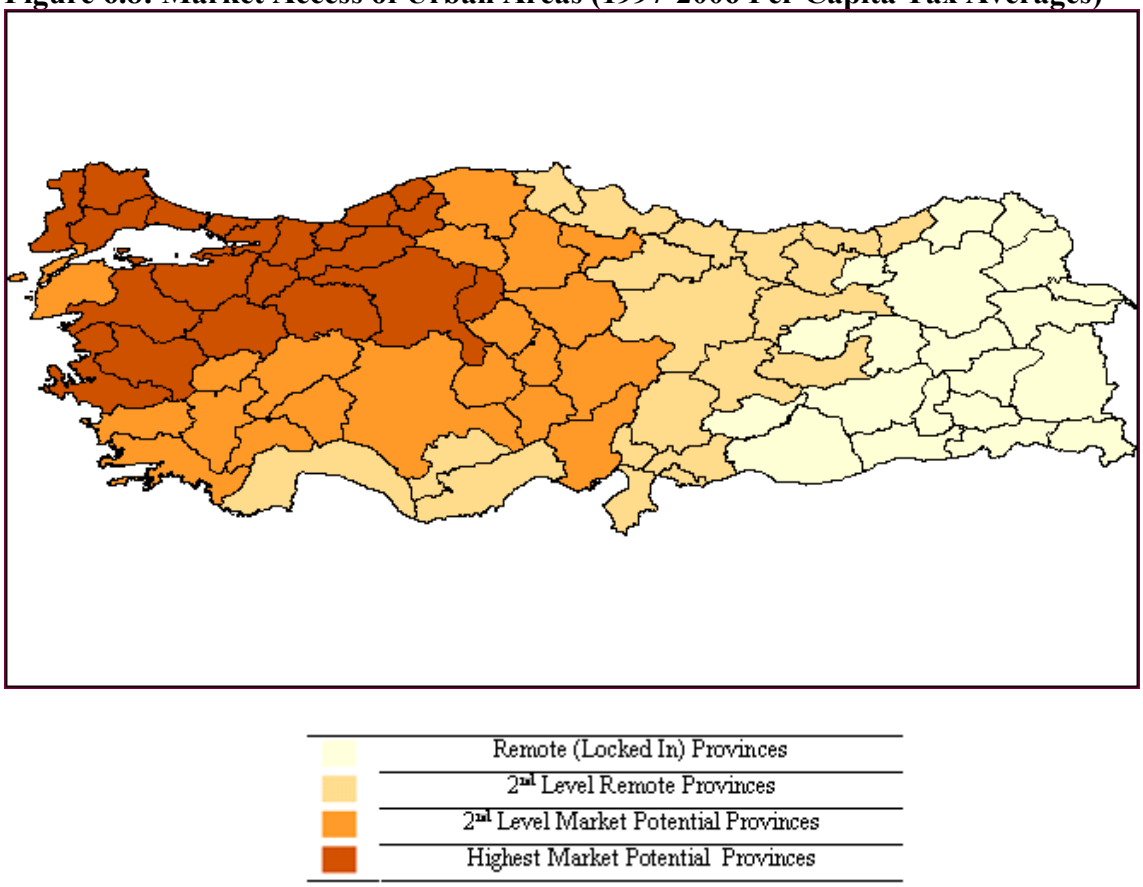
[55] See chapter 5 for a brief discussion regarding usage of tax revenues as a proxy for regional income.
[56] Note that, while findings represented here need careful observation, previous remarks of Dogruel and Dogruel (2003) is noteworthy here; regarding the major reasons behind the lagging structure of the east part of Turkey. While market access illustration here gives a general understanding regarding the inability to accessing to domestic markets, as emphasized by Dogruel and Dogruel (2003), the Cold War period of 1990s also prevents the region provinces to integrate with the Eastern border countries of Turkey.

Figure 6.7: Market Access of Urban Areas (1997-2001 Per Capita GDP Averages)



Source: TURKSTAT, author's calculations

Figure 6.8: Market Access of Urban Areas (1997-2006 Per Capita Tax Averages)



Source: TURKSTAT, author's calculations

6.5 Empirical Evidence for Role of Geography in Understanding Regional Firm Formation in Turkey

Originating from the ongoing discussion of the chapter, place of geography in understanding regional firm formation seems to be vital. While construction of SAR and SEM type of models can also be offered based on spatial autocorrelation analysis, it is found more informative to deal with the spatial effects by following the market access (MA) approach which indicates that role of geography coming from the market potential of regions.

While injection of the market access index into the previously estimated models is a way to cope with these issues, expected interdependence between market access and other regional social and economic properties of regions directs the study to use market access separately as to understand the relationship. Equation 6.4 represents the relationship in a static manner. $Y_{i,t}$ represents the new firm start up rate, $MA_{i,t}$ is the market access of provinces. Same relationship will also be estimated in a dynamic setting as shown by equation 6.5. Note that as discussed in the previous sub section, as per capita income figure is only available up to 2001, to balance the data set and to be consistent with the previous models, per capita tax revenues will be used to construct the market access index.

[6.4] $$Y_{i,t} = \alpha + \beta MA_{i,t} + \mu_i + v_{i,t}$$

[6.5] $$Y_{i,t} = \alpha + \phi Y_{i,t-1} + \beta MA_{i,t} + \mu_i + v_{i,t}$$

Overall the estimation for both models is carried out based on the introduced methodological discussion in chapter 4. For the static model both fixed and random effect models are estimated. For the dynamic model system GMM estimation is done. All results are reported in table 6.2. Overall findings indicate that market access matters for distribution of new firms for the three major economic activities in Turkey. While global spatial relationships for firm formation are found to be limited, remarks of cluster analysis and concerns regarding the locked in property of Eastern and Southeast Anatolia is clarified from the econometric findings. The basic models are informative in a number of ways. First of all

the similar to contemporary debate regarding the importance of distance to markets in EU, findings in Turkey indicate that provinces' business environments are highly influenced by the distance to markets. Moreover the neglected role of geographical proximity of regions is observed to be vital. In this sense, neighborhooding effects as well as impact of distance are both important. While overall less developed provinces of Turkey are found to be spatially correlated, overall these areas are also found to be the most distant once to markets, thus to demand both in terms of geographic proximity as well as the calculated market access indicators.

In the view of the dissertation, injection of the market access debate to the study is a valuable contribution to the regional economics literature in Turkey. While market access indicator is not injected to the previously mentioned models due to possible relationship between market access and the social and economical properties of the regions, the proposed models of the chapter can be regarded as an important signal towards the need for deeper analysis of regional issues, especially distribution of economic activity by taking into account the role of geography. In short findings of the chapter finds noteworthy to underline once more that, constructed idea of the ongoing study still needs to be developed and augmented.

Table 6.2: Market Access and Regional New Firm Formation in Turkey

	Manufacturing			Services			Trade		
	FE	**RE**	**System GMM**	**FE**	**RE**	**System GMM**	**FE**	**RE**	**System GMM**
New Firm Formation (-1)	-	-	0.9127* (0 .1264)	-	-	1.027* (0.0651)	-	-	0.9235* (0.0357)
Market Access	0.5251* (0.1864)	0.1671* (0.1148)	0.1264** (0.0587)	1.978* (0.1826)	0.7640* (0.1257)	0.5133** (0.2338)	0.8096* (0.1505)	0.1916** (0.0859)	0.1284* (0.0445)
F/Wald Stat. (p-value)	7.93 (0.000)	2.12 (0.1456)	356.06 (0.000)	117.25 (0.000)	36.97 (0.000)	170.86 (0.000)	28.95 (0.000)	4.97 (0.0258)	333.74 (0.000)
Observations	795	795	690	782	782	677	806	806	695
Haussmann Test (p-values)	5.94 (0.0148)		-	83.85 (0.000)		-	25.03 (0.000)		-
Hansen Test (p-values)	-	-	77.25 (0.06)	-	-	74.42 (0.07)	-	-	77.61 (0.06)
AR(2) Test (p-values)	-	-	1.39 (0.163)	-	-	3.30 (0.001)	-	-	0.48 (0.631)

Source: TURKSTAT, author's calculations

Standard Errors in ( ), *, **, *** represents significance at 1%, 5% and 10% respectively, for services AR (3) test stat is -1.81 (p value is 0.07). Preferred lags start from 4 for services.

7. Conclusion

Regional dispersion of wealth and income is observed from numerous perspectives. Among the urban and regional economics literature observations concentrate on the various reasons and consequences of the differences between districts, provinces, regions and countries. While the early urban models try to identify how producers' and consumers' location choice is determined in already formed city centers, regional economics try to carry out the debate from a perspective concentrated on the outcome of the location choice of the producers and consumers. Moreover regional economies somehow construct an understanding to discuss the development issue within the framework of national and regional concerns. Later with the rise of the new economics of geography (NEG), regardless of the unit of observation, attention of the scientists shift on the role of space and geography in understanding the distribution of economic activity. Here no specific assumption related with the formation of city centers or no policy oriented debate about the possible conflicts between regional and national development policies are carried out. Rather the objective is to understand how producers and consumers set their location decision in an economy.

When country case studies are observed it will be realized that concentration is most of the time the dispersion of income and the various determinants of these differences. Regional properties running from human capital bases to financial deepening are heavily investigated. However with the rise of NEG based theoretical models different mechanics evolve as to relate the regional differences with various forms of

economic activity of regions. Among them the location choice of production finds its place with the help of new firm formation literature. Both theoretical models as well as country case studies validate that location choice of production is heavily affecting the regional development and also deeply influenced by the regional social and economical environment. Overall it is evident that such a construction also bring some conceptual problems with itself, endogeneity issue is an example. From such a perspective keeping in mind the presence of conceptual difficulties, this dissertation concentrates on the impact of various social and economical properties of regions on the location choice of new firms. Both the theoretical framework of the location theory of new economic geographers as well as the recent advances in the regional and international economics are used to form the theoretical background of the dissertation.

Within this central discussion Turkey as a developing economy realizing substantial regional disparities is found to be a suitable area of study. Both the regional economics literature as well as the recently growing attention on spatial econometrics model in Turkey validates the increasing gap between developed and less developed regions of the country. Initial findings of the dissertation find supporting evidence that, the distribution of economic growth as well as the dispersion of economic activity is both spatially unequal among the 81 provinces of Turkey. Furthermore additional observations validate the concerns of the dissertation regarding the positive impact of new firms on the regional development from various channels in Turkey. Hence these initial remarks also confirm that distribution of new firms among the provinces of Turkey can be used to assess the recent developments in the income and wealth differences in Turkey. As the

date set preferred covers the 1997 2006 period, this will yield valuable information about the post 2001 period in Turkey, which is actually the regional per capita income announcement cut off date.

Keeping the positive relationship between regional new firm start ups and the regional income differences on one side, the core objective of the dissertation is diverted on the dispersion and dynamics behind the location choice of production. The preferred data set allows the dissertation to decompose production into three major economic activities: manufacturing, services and trade. Initial findings clearly show that although a limited decrease in the inequality of services and trade firm formation can be captured by observing the sigma convergence and coefficient of variation measures at the end spatial dispersion of the firm formation is observed to be unequal in all economic activities. This unequal pattern is mostly parallel with the dispersion of per capita income, which can be observed for the pre 2001 period. Thus understanding the background of the reasons behind the dispersion of economic activity is expected to give additional information about the differences between provinces in Turkey. For each economic activity a number of hypotheses of the location theory are tested. Here as mentioned more than a few times through out the dissertation regional data availabilities act as the core constraint of the study. Based on the limitations constructed models indicate that regional demand, regional financial development, education quality to some extent and specialization of new firms affect the location choice of the economic activity. Here a number of remarks are worth mentioning. First of all a significant difference for the determinants of economic activity for decomposed three economic activity can not be detected. This

means that different economic activities are mainly affected by the common economical and social structures of provinces. Second of all Istanbul, although captures the most of the new firms in Turkey, even exclusion of Istanbul do not affect the overall dynamics observed in the location choice of production.

Findings about the dispersion and dynamics of new firms are based on the assumption that regional interactions in the form of geographical impacts as well as neighbor interactions are not presents. This spatial (and/or geographic) randomness assumption is also questioned. First set of findings about the global spatial autocorrelation points out the significant spatial interaction of provinces in Turkey. As this broad spatial autocorrelation measure only gives the spatial interaction to some extent, decomposition of the statistic is also carried out by the help of LISA indicators. This procedure gives valuable information about the rising interaction among the eastern provinces of Turkey. Moreover illustrations confirm that there is a dual structure, which can be explained by spatial heterogeneity in the new firm formation of provinces. Here the presence of geographic patterns is found to be stronger with respect to the spatial interactions, thus instead of adding a variable to account for the role of spatial associations, the role of geography is introduced and questioned whether geographical proximity affect firms' location choice or not. To do so market access of provinces is computed, which is a distance weighted sum of the per capita tax revenues of the provinces. Final models confirm the concerns that geographical position of a province, which is measured by market access and gives the remoteness of that province, has strong influence on the location choice of new firms. Finally estimated dynamic models to test

the impact of geography on firm formation indicate that the coefficient of the lagged value of the firm formation is close to one; remarking the increasing regional divergence. Hence it is inevitable to remark that the spatial unequal distribution of firm formation, which is already realized in the descriptive calculations, is also validated in the empirical models.

Over all these conclusions there are a number of issues that are not investigated and left as some future study areas. While the models and the discussion carried out the dissertation controls for a number of different dynamics, the study fails to control for some other important issues which are expected to be effective in the process of firm location choice. Incentives and their dispersion across the geography of Turkey is one them. Moreover the decomposition of the new firms in terms of country of origin is another issue. Following the numerous impacts of foreign direct investment (FDI) a discussion about the source of the new firms could also be investigated. However both data constraints as well as probable shortfall such as losing the central theme of the dissertation prevents the construction to use these two motives in the empirical part of the study. Another issue is related with the theoretical and conceptual discussions. First of all as remarked for a number of times the location choice of production and the regional differences realize a circular causality. This circulation is not investigated through out the study; instead the relationship running from the regional social and economical properties towards the location choice of production is observed. Second of all the theoretical insight of new economics of geography and the recent advances in entrepreneurial growth models are somehow conflicting with each other; while geographers prefer to remark

importance of scale in location choice of production, other view points out that free from the scale new firm's location choice is still vital as they will contribute to knowledge transfer. This conflict between scale and the knowledge transfer capabilities of new firms is not investigated in the literature as well as in this dissertation. All these areas remarked are valuable issues and should be regarded as important future research areas.

Overall the central contributions of the dissertation can be captured in a number of points. First of all the methodology preferred allows the investigation of three different economic activities' dispersion at province level for a ten year time period, which has not been done for Turkey before. Secondly linking the dispersion of economic activity with the differences in regional economic income offers a new perspective to investigate the regional differences in Turkey. This helps the assessment of the unobserved post 2001 period in Turkey. Finally investigation of spatial association as well as the role of geography gives important information. In the knowledge of this study the dissertation is one of the first attempts to carry out the geography's and spatial associations' impact from regional income differences towards the dispersion of firm's location choice. While augmenting the research question by using a geographically dependent model is a contribution to the dissertation, findings can also be regarded as a sign for the necessity of the usage of geography and spatial interaction in regional studies carried out for Turkey.

Appendix A

Table A.1: Geographic Distribution of New Firm Start Ups (Manufacturing)

NUTS 1 Region	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TR1 Istanbul	7834	6803	2863	3264	3071	3831	4472	4379	4474	4704
TR2 West Marmara	367	265	136	120	109	141	156	179	190	236
TR3 Aegean	2575	1937	700	781	753	931	1083	1216	1022	1324
TR4 East Marmara	1706	1362	431	451	513	585	750	845	829	1063
TR5 West Anatolia	2310	1792	663	686	654	706	825	976	1035	1156
TR6 Mediterranean	1591	1082	383	457	404	489	595	653	629	752
TR7 Central Anatolia	551	430	175	180	133	135	174	272	257	289
TR8 West Blacksea	439	394	133	155	97	100	147	203	211	263
TR9 East Blacksea	222	212	88	76	72	49	61	110	103	127
TRA Northeast Anatolia	116	145	101	70	30	37	44	58	75	54
TRB Middle East Anatolia	177	202	105	105	59	63	85	96	92	85
TRC Southeast Anatolia	651	572	259	318	197	211	303	324	332	358

Source: TURKSTAT

Table A.2: Geographic Distribution of New Firm Start Ups (Services)

NUTS 1 Region	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TR1 Istanbul	3003	6803	2863	3264	3071	3831	4472	4379	4474	4704
TR2 West Marmara	186	184	64	91	81	75	81	114	156	231
TR3 Aegean	1166	1127	537	664	552	600	535	752	1128	1327
TR4 East Marmara	524	444	230	336	273	244	256	333	512	646
TR5 West Anatolia	1409	1260	695	1126	842	774	690	1041	1302	1509
TR6 Mediterranean	986	831	336	493	460	458	515	760	1065	1254
TR7 Central Anatolia	156	166	82	103	91	91	77	155	195	221
TR8 West Blacksea	155	143	57	103	73	72	75	103	179	178
TR9 East Blacksea	142	124	54	56	54	55	49	73	109	161
TRA Northeast Anatolia	40	56	37	46	38	31	15	36	52	67
TRB Middle East Anatolia	76	103	66	79	42	61	34	75	114	121
TRC Southeast Anatolia	152	203	91	152	96	76	94	159	197	220

Source: TURKSTAT

Table A.3: Geographic Distribution of New Firm Start Ups (Trade)

NUTS 1 Region	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TR1 Istanbul	6372	6803	2863	3264	3071	3831	4472	4379	4474	4704
TR2 West Marmara	656	517	246	227	231	232	267	320	415	525
TR3 Aegean	2829	2533	1063	1145	1410	1316	1305	1588	1815	2070
TR4 East Marmara	1765	1572	554	694	729	689	701	840	1017	1252
TR5 West Anatolia	3479	2582	1151	1526	1526	1472	1423	1761	2064	2057
TR6 Mediterranean	2822	2167	826	1049	1188	1199	1139	1528	1718	1767
TR7 Central Anatolia	945	724	268	287	317	286	283	427	460	508
TR8 West Blacksea	760	640	296	256	290	280	281	367	438	511
TR9 East Blacksea	513	512	185	192	170	182	123	245	274	264
TRA Northeast Anatolia	238	354	237	201	168	138	120	171	243	206
TRB Middle East Anatolia	342	476	424	499	230	244	211	284	355	343
TRC Southeast Anatolia	971	921	515	863	601	433	426	664	797	878

Source: TURKSTAT

Appendix B

Table B.1: Determinants of New Firm Start-ups (Model II-B)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**System GMM**	**FE**	**RE**	**System GMM**	**FE**	**RE**	**System GMM**
Y (-1)	-	-	0.263* (0.043)	-	-	0.249* (0.057)	-	-	0.325* (0.032)
2001 Dummy	-0.524* (0.053)	-0.519* (0.051)	-0.332* (0.049)	-0.304* (0.053)	-0.336* (0.052)	-0.265* (0.053)	-0.263* (0.043)	-0.304* (0.046)	-0.155* (0.044)
Tax Revenues	0.610* (0.129)	0.584* (0.047)	0.565* (0.077)	1.051* (0.134)	0.757* (0.051)	0.583* (0.072)	0.849* (0.103)	0.469* (0.037)	0.330* (0.047)
Uni. Edu Quality	0.373* (0.102)	0.198* (0.059)	0.009 (0.053)	0.043 (0.079)	0.090*** (0.053)	0.156* (0.057)	0.220** (0.086)	0.155* (0.04*	0.108** (0.046)
Hausman Test Stat (p)	4.59 (0.20)		-	6.52 (0.09)		-	15.79 (0.00)		-
F/Wald Test (p)	63.83 (0.00)	351.99 (0.00)	71.11 (0.00)	45.76 (0.00)	309.07 (0.00)	70.04 (0.00)	47.62 (0.00)	259.09 (0.00)	103.43 (0.00)
AR(2) Test Stat (p)	-	-	-1.43 (0.153)	-	-	0.81 (0.418)	-	-	-1.59 (0.112)
Hansen Test Stat (p)	-	-	77.91 (0.170)	-	-	77.15 (0.186)	-	-	79.44 (0.142)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

Table B.2: Determinants of New Firm Start-ups (Model II-C)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**System GMM**	**FE**	**RE**	**System GMM**	**FE**	**RE**	**System GMM**
Y (-1)	-	-	0.384* (0.045)	-	-	0.235* (0.048)	-	-	0.381* (0.033)
2001 Crisis Dummy	-0.503* (0.051)	-0.496* (0.054)	-0.349* (0.053)	-0.304* (0.053)	-0.328* (0.053)	-0.299* (0.049)	-0.255* (0.043)	-0.286* (0.046)	-0.174* (0.045)
Tax Revenues	0.661* (0.131)	0.726* (0.051)	0.523* (0.091)	0.997* (0.155)	0.793* (0.054)	0.597* (0.084)	0.837* (0.119)	0.577* (0.040)	0.309* (0.052)
Sec. Edu Enrolment Rate	-1.300 (0.105)	-0.998* (0.097)	-0.117 (0.149)	-0.440 (0.104)	-0.322* (0.092)	-0.001 (0.188)	-0.874* (0.092)	-0.682* (0.078)	-0.034 (0.077)
Hausman Test Stat (p)	52.45 (0.00)		-	5.86 (0.12)		-	20.06 (0.00)		-
F/Wald Test (p)	107.57 (0.00)	374.89 (0.00)	249.75 (0.00)	39.58 (0.00)	286.44 (0.00)		61.29 (0.00)	278.44 (0.00)	163.99 (0.00)
AR(2) Test Stat (p)	-	-	-1.34 (0.179)	-	-	0.52 (0.601)	-	-	-1.44 (0.150)
Hansen Test Stat (p)	-	-	79.46 (0.649)	-	-	78.12 (0.660)	-	-	79.90 (0.636)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

TableB.3: Determinants of New Firm Start-ups (Model II-D)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**System GMM**	**FE**	**RE**	**System GMM**	**FE**	**RE**	**System GMM**
Y (-1)	-	-	0.407* (0.054)	-	-	0.241* (0.047)	-	-	0.306* (0.039)
2001 Crisis Dummy	-0.519* (0.056)	-0.508* (0.053)	-0.347* (0)	-0.309* (0.053)	-0.331* (0.052)	-0.312* (0.049)	-0.268* (0.043)	-0.296* (0.047)	-0.157* (0.043)
Tax Revenues	0.739* (0.138)	0.700* (0.058)	0.451* (0.075)	0.996* (0.153)	0.069* (0.058)	0.461* (0.090)	0.889* (0.128)	0.584* (0.044)	0.355* (0.064)
Uni. Edu Enrolment Rate	-0.488* (0.063)	-0.183 (0.047)	-0.016 (0.036)	-0.088 (0.069)	-0.046 (0.046)	0.025 (0.042)	-0.334* (0.064)	-0.185 (0.037)	-0.065** (0.031)
Hausman Test Stat (p)	51.13 (0.00)		-	2.29 (0.51)		-	10.20 (0.02)		-
F/Wald Test (p)	71.60 (0.00)	323.31 (0.00)	74.85 (0.00)	38.39 (0.00)	277.82 (0.00)	58.12 (0.00)	38.64 (0.00)	227.05 (0.00)	95.99 (0.00)
AR(2) Test Stat (p)	-	-	-0.92 (0.356)	-	-	0.48 (0.628)	-	-	-1.56 (0.119)
Hansen Test Stat (p)	-	-	62.93 (0.122)	-	-	76.85 (0.149)	-	-	79.47 (0.142)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

Table B.4: Determinants of New Firm Start-ups (Model III-B)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**System GMM**	**FE**	**RE**	**System GMM**	**FE**	**RE**	**System GMM**
Y (-1)	-	-	0.359* (0.035)	-	-	0.215* (0.050)	-	-	0.337* (0.032)
2001 Dummy	-0.284 (0.053)	-0.373* (0.053)	-0.215* (0.078)	-0.191* (0.058)	-0.249* (0.057)	-0.192* (0.066)	-0.101** (0.048)	-0.174* (0.052)	-0.058 (0.057)
Tax Revenues	0.478* (0.133)	0.561* (0.071)	0.768* (0.178)	0.765* (0.150)	0.615* (0.076)	0.827* (0.165)	0.689* (0.124)	0.603* (0.071)	0.734* (0.131)
Sec. Edu. Quality	1.535* (0.145)	1.091* (0.111)	0.569* (0.135)	1.161* (0.156)	0.854* (0.123)	0.589* (0.148)	1.147* (0.137)	0.700* (0.094)	0.347* (0.125)
Deposit Volume	-0.613* (0.156)	-0.095 (0.083)	-0.389** (0.167)	-0.022 (0.165)	0.047 (0.089)	-0.280 (0.168)	-0.369* (0.140)	-0.279* (0.073)	0.479* (0.108)
Hausman Test Stat (p)	35.91 (0.00)		-	16.78 (0.00)		-	29.29 (0.00)		-
F/Wald Test (p)	77.46 (0.00)	492.01 (0.00)	175.35 (0.00)	50.18 (0.00)	454.29 (0.00)	74.34 (0.00)	52.45 (0.00)	297.52 (0.00)	89.45 (0.00)
AR(2) Test Stat (p)	-	-	-0.44 (0.659)	-	-	0.99 (0.320)	-	-	-0.84 (0.40)
Hansen Test Stat (p)	-	-	76.25 (0.160)	-	-	74.76 (1.91)	-	-	77.42 (0.139)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

Table B.5: Determinants of New Firm Start-ups (Model V-B)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**System GMM**	**FE**	**RE**	**System GMM**	**FE**	**RE**	**System GMM**
Y (-1)	-	-	0.349* (0.028)	-	-	0.055 (0.049)	-	-	0.334* (0.031)
2001 Dummy	-0.349* (0.050)	-0.367* (0.056)	-0.267* (0.056)	-0.057 (0.053)	-0.080 (0.056)	-0.003 (0.053)	-0.112** (0.048)	-0.165* (0.055)	-0.049 (0.055)
Tax Revenues	0.281** (0.132)	0.416* (0.056)	0.239* (0.072)	0.452* (0.137)	0.433* (0.060)	0.271** (0.116)	0.518* (0.127)	0.332* (0.051)	0.114** (0.055)
Sec. Edu. Quality	1.405* (0.158)	0.899* (0.123)	0.183*** (0.109)	0.802* (0.159)	0.585* (0.137)	0.508*** (0.283)	1.001* (0.145)	0.504* (0.107)	-0.049 (0.179)
Credit Volume	0.077 (0.049)	0.146* (0.047)	0.154* (0.045)	0.239* (0.049)	0.265* (0.049)	0.378* (0.070)	0.096** (0.038)	0.117* (0.039)	0.158* (0.059)
Public Expenditures	-0.173 (0.135)	-0.289* (0.100)	-0.071 (0.080)	0.302** (0.128)	0.213** (0.098)	0.179 (0.131)	-0.065 (0.126)	0.042 (0.084)	0.140 (0.088)
Hausman Test Stat (p)	25.03 (0.00)		-	8.84 (0.1154)		-	24.71 (0.00)		-
F/Wald Test (p)	70.78 (0.00)	547.31 (0.00)	137.00 (0.00)	68.72 (0.00)	514.80 (0.00)	55.59 (0.00)	57.22 (0.00)	400.71 (0.00)	68.39 (0.00)
AR(2) Test Stat (p)	-	-	-0.97 (0.330)	-	-	0.76 (0.448)	-	-	-0.72 (0.469)
Hansen Test Stat (p)	-	-	78.92 (0.115)	-	-	75.08 (0.142)	-	-	78.71 (0.136)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

TableB.6: Determinants of New Firm Start-ups (Model V-C)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**S-GMM**	**FE**	**RE**	**S-GMM**	**FE**	**RE**	**S-GMM**
Y (-1)	-	-	0.527* (0.093)	-	-	0.051 (0.084)	-	-	0.385* (0.032)
Density Man.	-	-	-	-0.204* (0.075)	-0.143** (0.073)	-0.363** (0.159)	-0.055 (0.067)	0.034 (0.063)	-0.204** (0.091)
Density Services	-0.446* (0.055)	-0.322* (0.052)	-0.318* (0.108)	-	-	-	-0.344* (0.051)	-0.224* (0.047)	-0.122** (0.056)
Density Trade	-0.806* (0.160)	-0.863* (0.167)	-3.55* (0.760)	-0.726* (0.145)	-0.772* (0 151)	-3.06* (0.522)	-	-	-
Hausman Test (p)	39.21 (0.00)		-	11.18 (0.00)		-	44.14 (0.00)		-
F/Wald Test (p)	44.10 (0.00)	57.11 (0.00)	32.80 (0.00)	13.46 (0.00)	26.30 (0.00)	12.43 (0.00)	22.59 (0.00)	23.76 (0.00)	62.64 (0.00)
AR(2) Test Stat (p)	-	-	-0.64 (0.5240	-	-	-0.30 (0.767)	-	-	0.32 (0.752)
Hansen Test (p)	-	-	23.06 (0.188)	-	-	64.22 (0.101)	-	-	79.31 (0.259)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

TableB.7: Determinants of New Firm Start-ups, Excluding Istanbul (Model VI-B)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**System GMM**	**FE**	**RE**	**System GMM**	**FE**	**RE**	**System GMM**
Y (-1)	-	-	0.346* (0.028)	-	-	0.059 (0.049)	-	-	0.382* (0.035)
2001 Dummy	-0.352* (0.052)	-0.374* (0.056)		-0.055 (0 .054)	-0.081 (0.056)	-0.017 (0.057)	-0.112* (0.048)	-0.168* (0.056)	-0.062 (0.058)
Tax Revenues	0.287* (0.133)	0.382* (0.055)	0.230* (0.074)	0.450* (0.138)	0.415* (0.062)	0.189*** (0 .098)	0.520* (0.127)	0.316* (0.052)	0.051 (0.053)
Sec. Edu. Quality	1.414* (0.161)	0.931* (0.124)	0.227** (0.107)	0.805* (0.162)	0.598* (0.140)	0.639** (0.279)	1.008* (0.148)	0.521* (0.109)	-0.161 (0.130)
Credit Volume	0.078 (0.049)	0.138* (0.047)	0.138* (0.046)	0.237* (0.049)	0.261* (0.049)	0.319* (0.082)	0.096** (0.038)	0.111* (0.039)	0.196* (0.054)
Public Expenditures	-0.193 (0.139)	-0.283* (0.101)	-0.066 (0.084)	0.314** (0.134)	0.225** (0.100)	0.286 (0.191)	-0.070 (0.131)	0.051 (0.086)	0.149 (0.089)
Hausman Test Stat (p)	22.26 (0.00)		-	8.44 (0.13)		-	22.71 (0.00)		-
F/Wald Test (p)	69.71 (0.00)	516.28 (0.00)	133.38 (0.00)	68.63 (0.00)	481.48 (0.00)	45.09 (0.00)	56.88 (0.00)	368.72 (0.00)	71.54 (0.00)
AR(2) Test Stat (p)	-	-	-1.01 (0.313)	-	-	0.79 (0.428)	-	-	-0.97 (0.333)
Hansen Test Stat (p)	-	-	77.82 (0.132)	-	-	74.64 (0.150)	-	-	78.67 (0.119)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

TableB.8: Determinants of New Firm Start-ups, Excluding Istanbul (Model VI-C)

	Y=Manufacturing			Y=Services			Y=Trade		
	FE	**RE**	**System GMM**	**FE**	**RE**	**System GMM**	**FE**	**RE**	**System GMM**
Y (-1)	-	-	0.523* (0.096)	-	-	0.040 (0.082)	-	-	0.377* (0.032)
Density Man.	-	-	-	-0.204* (0.075)	-0.149** (0.072)	-0.408** (0.157)	-0.056 (0.066)	0.021 (0.063)	-0.213** (0.091)
Density Services	-0.444* (0.055)	-0.316* (0.052)	-0.331* (0.108)	-	-	-	-0.343* (0.051)	-0.225* (0.047)	-0.128** (0.056)
Density Trade	-0.801* (0.161)	-0.854* (0.166)	-3.573* (0.766)	-0.722* (0.145)	-0.768* (0.151)	-3.083* (0.524)	-	-	-
Hausman Test (p)	36.12 (0.00)		-	8.98 (0.01)		-	39.14 (0.00)		-
F/Wald Test (p)	43.40 (0.00)	55.61 (0.00)	31.51 (0.00)	13.32 (0.00)	26.11 (0.00)	12.16 (0.00)	22.35 (0.00)	23.49 (0.00)	62.52 (0.00)
AR(2) Test Stat (p)	-	-	-0.63 (0.526)	-	-	-0.38 (0.702)	-	-	0.29 (0.776)
Hansen Test (p)	-	-	22.90 (0.194)	-	-	62.84 (0.124)	-	-	78.32 (0.285)

*, **, *** represents significance at 1%, 5% and 10% respectively, robust standard errors in ()

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