CRITICAL EVALUATION OF
ENDOGENOUS REGIONAL DEVELOPMENT THEORIES

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ABSTRACT

CRITICAL EVALUATION OF
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Regional development discourses and theories have significantly changed since the born of regional science. Focus of regional development theories has shifted from industrialization efforts via large-scale enterprises and transfer of central government funds to disadvantaged regions to endogenous capabilities and potentials of innovation and knowledge creation.

Endogenous factors and self-development capabilities are highly emphasized by recent development literature. Changes in the regional development discourses also affected regional policies, policy tools and actors; endogenous factors and self-development discourses became dominant in regional development policies and implementations. However, source of regional development for less developed regions that do not have endogenous potentials and self-development capability have not clearly defined and have not empirically tested.

The thesis attempted to empirically define regional growth factors and the usefulness of theoretical frameworks. In the thesis, econometric model of Turkey is used for the empirical study.

The theoretical framework discussed in the thesis is both economic theories and regional development models. The study shows that all theoretical models offer only partial explanations of regional growth. While study shows that factors emphasized by traditional theories support regional growth, the study has no evidence supporting that soft factors emphasized by recent theories support regional growth.

The main findings of this study contribute to theoretical and empirical field by reintroducing role of government and interventions. Factors highlighted by recent regional development theories are not sufficient for explaining growth, since the regional policies at the national level continue to be important therefore factors emphasized by traditional theories still have significant contributions to growth.

ÖZ

İÇSEL BÖLGESEL KALKINMA TEORİLERİNİN
ELEŞTİREL DEĞERLENDİRİLMESİ

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Bölgesel kalkınma söylem ve teorileri bölge biliminin doğduğu tarihten itibaren önemli ölçüde değişmiştir. Bölgesel kalkınma teorilerinin vurgusu büyük ölçekli işletmeler aracılığıyla sanayileşme çabaları ve dezavantajlı bölgelere merkezi fon transferinden; içsel yetenekler ve yenilik ve bilgi yaratma potansiyellerine yönelmiştir.

Güncel ekonomik ve bölgesel kalkınma literatürü içsel faktörleri ve kendini geliştirmeyi önemli biçimde vurgulanmaktadır. Bölgesel kalkınma söylem ve teorilerindeki dönüşüm; bölgesel politikaları, politika araçlarını ve aktörleri de etkilemiştir. İçsel faktörler ve kendi kendine gelişme söylemleri bölgesel kalkınma politikaları ve uygulamalarında da hakim olmuştur. Ancak, içsel potansiyeli ve kendi kendine gelişme yeteneği olmayan az gelişmiş bölgeler için bölgesel kalkınmanın kaynağı henüz tanımlanmış değildir ve ampirik olarak test edilmemiştir.

Tez ampirik olarak bölgesel büyüme faktörlerini tanımlamaya ve kuramsal çerçevelerin açıklama düzeylerini belirlemeye çalışmaktadır. Tezde ampirik çalışma için Türkiye'nin ekonometrik modeli kullanılmıştır.

Tezde tartışılan teorik çerçeve ekonomik teoriler ve bölgesel kalkınma modelleridir. Çalışma tüm modellerin bölgesel büyüme için sadece kısmi açıklamalar sunmakta olduğunu göstermektedir. Ampirik çalışma, geleneksel teoriler tarafından vurgulanan faktmörlerin büyümeyi desteklediğini gösterirken; yeni teoriler tarafından vurgulanan net olarak tanımlanamayan faktörlerin büyümeyi deteklediğine yönelik kanıt bulamamıştır.

Bu çalışmanın ana bulguları teorik ve ampirik alana devletin rolünü ve müdahaleleri yeniden sunarak katkı sağlamaktadır. Yeni bölgesel kalkınma teorileri tarafından vurgulanan faktörler büyümeyi açıklamak için yeterli değildir, ulusal düzeyde bölgesel politikalar önemli olmaya devam etmektedir, bu nedenle, geleneksel kuramlar tarafından vurgulanmış faktörlerin büyümeye hala önemli katkıları olmaktadır.

Anahtar Kelimeler: Bölgesel Kalkınma Kuramları, Bölgesel Büyüme, Büyüme Faktörleri, İçsel Büyüme, Dışsal Müdahale, Devletin Rolü, Kamu Harcamaları, Teşvikler.

To my wife Selma

and my son Özgür Onur

ACKNOWLEDGMENT

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LIST OF ABBREVIATIONS

DAP	Eastern Anatolia Project
DOKAP	Eastern Black sea Regional Development Plan
EU	European Union
EUROSTAT	Statistical Office of the European Union
FYDP	Five-Year Development Plan
GDP	Gross Domestic Product
GDPPC	Gross Domestic Product Per Capita
GIS	Geographic Information System
GNP	Gross National Product
GVA	Gross Value Added
IMF	International Monetary Fund
MPWS	Ministry of Public Works and Settlements
NDP	National Development Plan
NGO	Non-Governmental Organization
NUTS	Nomenclature of Units for Territorial Statistics
OECD	Organization for Economic Cooperation and Development
OIZ	Organized Industrial Zone
PNDP	Preliminary National Development Plan
PRD	Priority Regions in Development
R&D	Research and Development
SCI	Science Citation Index Expanded
SME	Small and Medium Sized Enterprise
SPO	State Planning Organization
TURKSTAT	Turkish Statistical Institute
VAT	Value Added Tax
YHGP	Yeşilırmak Basin Development Project

CHAPTER 1

INTRODUCTION

1.1   *The Context and the Aim of the Thesis*

Regional development discourses and theories have significantly changed. The shift is mainly from the traditional growth theories, which focused on production investments and transfer of central government funds to disadvantaged regions, to regional growth based upon endogenous capabilities and potential of innovation necessitating knowledge creation. Three paradigms can be defined in the regional development history spanning from born of regional science towards the contemporary world.

The first paradigm started with the born of regional sciences in the post-war era and was in force until the 1970s crisis. In this period, it was believed that regional development can be initiated by external support mechanisms, which facilitate the development process by creating infrastructure and leading production. Strong nation state and measures for public resource transfers for development were the main characteristics of the first period.

1970 crisis which caused to significant changes in economic regimes in the world brought new regional development approach based on local production dynamics. Flexible production system was the response to the problems of Fordist type of production. Industrial districts and clusters were identified as the means of achieving and maintaining local economic success. Sources of regional development, in this period, were defined as local dynamics and assets such as human capital, vertical disintegration, horizontally integrated economy, and collective entrepreneurship. It is significant to note that, in this period role of state was not expressed.

The increasing effect of globalization in1990s caused to development of the third paradigm. Sources of regional development are seen as social capital, social embeddedness of economic relations, untraded interdependencies, knowledge, learning capacity and internally driven technical and organizational innovation. While in a highly competitive borderless environment, knowledge economy become more noticeable, the importance of local production dynamics lost their dominance. Knowledge, learning and innovation raised its significance in this period. Role of state to develop the local dynamics and assets are distinctly mentioned in this period.

As a result of post rationalization efforts, growing emphasis occurred on the importance of endogenous potentials for regional development. The emphasizes have gradually increased since 1970s. Recent development literature overemphasizes endogenous factors and self-development.

Although there are huge empirical analyses supporting these theoretical propositions, these studies are limited in their scope, and not comprehensive, besides most of the studies focused on economically advanced economies with high local capacity.

Comparable studies of less developed countries and their regions that suffer from poverty, unemployment and regional disparities are far fewer. Recent empirical analyses select case studies support the theories; neglect or relegate fundamentals of capitalist economies; play

up transitory or even illusory characteristics like trust and reciprocity; neglect the role of domination, subordination, and power in business relationships.

Changes in the regional development discourses also affected regional policies, policy tools and actors. Due to the growing emphasis, endogenous factors and self-development discourses became dominant in regional development policies and implementations. New regional policies have certainly changed the traditional role of state in regional development. However dynamics of regional development in less developed national economies and less developed regions are not clearly defined and not empirically tested. This is an unseen obstacle for undeveloped regions that do not have self-development capability.

The question on development of regions that do not possess adequate capacity for development, like learning capacity, small and medium size entrepreneurship, networks of mutual trust among institutions, remains unsolved. The unanswered question constitutes the main motive of this study: "Do factors that are emphasized by endogenous regional development theories able to explain the development of all regions?".

The thesis aims to define dynamics of regional development and to discuss explanatory power of economic and regional growth theories. In other words, thesis seeks to identify and understand, empirically, the drivers of regional development.

The answer to the research question is firstly based on a review of the literature about regional development approaches; economic base theory (Hoyt, 1954; Douglass, 1955), growth pole theory (Perroux, 1955), flexible production theory (Scott and Storper, 1992), new industrial district and clustering (Becattini, 1979; Scott, 1988; Porter, 2000), innovative milieu (Aydalot, 1986; Maillat, 1995; Maillat 1996; Maillat and Lecoq, 1992), learning regions (Florida, 1995) and regional innovation system (Cooke, et. al. 1997). In addition to the regional development theories, main economic growth approaches (classical growth theory (Smith, 1776) keynesian theory (Keynes, 1936), neoclassical growth theory (Solow, 1957 and Swan, 1956), endogenous growth theory (Howitt, 2008; Brzezinski and Dzielinski, 2009; Segerstrom, Anant and Dinopoulos, 1990; Grossman and Helpman, 1991a; 1991b; 1991c; Aghion and Howitt, 1992; Dinopoulos, 1994), linear stages (Rostow, 1956; 1960 and Gerschenkron, 1962) structural change models (Lewis, 1954; Chenery, 1960; Chenery and Taylor, 1968)) are reviewed. It is possible to take out some clues from economic growth approaches in growth processes and growth factors in order to highlight regional development theories. These dimensions are taken as guidelines in the empirical survey to define the effects of factors mentioned in economic growth theories and regional development theories. The following section briefly explains the design of case study.

1.2 Design of the Case Study

Derived from this aim, an empirical study is designed to determine growth factors. The empirical study tests economic growth and regional economic development theories.

The analysis is founded on fourteen reviewed theories of economic growth and regional economic development. From these theories, hypothesized drivers of regional growth are identified. These regional growth drivers include: production factors, supply and demand, public expenditure, government incentive, government intervention, scale and agglomeration economies, accumulation of knowledge, production infrastructure, production organization, specialization, networks, value chains, local characteristics, innovation / R&D capacity, innovation infrastructure and capacity, supportive infrastructure or knowledge generation subsystem.

After identification of growth factors, possible proxy measures are defined to assess each factor. In this stage, theories, empirical studies and availability of for defined proxy are considered and a dataset is compiled.

2

An econometric model is constructed by considering specification and data issues for 81 NUTS 3 regions of Turkey which is a developing country with a regional development differences problem. These theories and drivers are nested in a single numeric model as the theoretical prepositions contained in the individual theoretical models are either ambiguous or lack clarity of expression.

1.3   The Content of the Thesis

This thesis consists of seven chapters. Chapter One makes introduction to the thesis and outlines the key issues.

After the introduction, Chapter Two puts the discussion into the evolution of growth factors from hard and exogenous factors to soft and endogenous factors. Chapter Two draws theoretical frame of the study. It reviews the economic and regional theories: classical growth theory (Smith, 1776) keynesian theory (Keynes, 1936), neoclassical growth theory (Solow, 1957 and Swan, 1956), endogenous growth theory (Howitt, 2008; Brzezinski and Dzielinski, 2009; Segerstrom, Anant and Dinopoulos, 1990; Grossman and Helpman, 1991a; 1991b; 1991c; Aghion and Howitt, 1992; Dinopoulos, 1994), linear stages (Rostow, 1956; 1960 and Gerschenkron, 1962), structural change models (Lewis, 1954; Chenery, 1960; Chenery and Taylor, 1968), economic base theory (Hoyt, 1954; Douglass, 1955), growth pole theory (Perroux, 1955), flexible production theory (Scott and Storper, 1992), new industrial district and clustering (Becattini, 1979; Scott, 1988; Porter, 2000), Innovative Milieu (Aydalot, 1986; Maillat, 1995; Maillat 1996; Maillat and Lecoq, 1992), learning regions (Florida, 1995) and regional innovation system (Cooke, et. al. 1997).

Chapter Two visualizes, for this reason, evolution of both economic growth and regional development theories and the increasing emphases on endogenous factors are more deeply scrutinized in order to highlight the transformation process.

As mentioned above, changes in regional development discourses also affected regional development policies. After having studied the theoretical framework, Chapter Three provides an analysis of regional development policies in Turkey. First, regional policies are discussed over six different periods: maturing period for nation and the period of estatism (1923 – 1950), institutionalization of regional development (1950 – 1960), emphasis on regional planning and development (1960 -1972), the rise of province based planning and development (1973 – 1980), initiation of neo-liberal policies/ emphasis on endogenous growth (1980 – 2000) and Europeanization and localization (after 2000). Then, regional policy tools, including regional plans and projects, state aid and incentives, public investments and regional development programmes, are discussed.

Chapter Four focuses on the methodology and design of the case study. In this chapter, aim and context of the thesis, the hypothesis and research design are explained. Under research design section the need for using general to specific modeling which is preferred among rich set of tools and main characteristics of general to specific modeling, specification and data issues, the choice of the development factors, proxies and data sources are explained.

Chapter Five discusses GDP per capita growth performance and main characteristics of selected proxies for both for Turkey and NUTS 3 level. The characteristics of proxies are analyzed for 1980-2008 period.

Chapter Six aims to develop an understanding of the regional dynamics of economic growth in Turkey by running an econometric model. A set of econometric models is developed to explore the validity of a range of theoretical propositions in explaining the trajectories of regional economic change in Turkey. This chapter explains empirically, the drivers of local and regional development in Turkey.

The last chapter, Chapter Seven concludes the thesis by giving a general evaluation of the study and a brief summary on the findings stated in the thesis. Main contribution of the thesis to theoretical and empirical literature and policy arena is discussed.

CHAPTER 2

INCREASING EMPHASIS ON ENDOGENOUS FACTORS IN THE GROWTH LITERATURE

Regional development theories are formed by issues that can be outlined as perception and representation of current socio- economic environment; assumptions on society, individual and market; objectives; policy tools; criticism and epistemological positions. Regional development paradigms have evolved parallel to the changes in these concepts.

A planned developmentalist perspective was dominant at the early period of regional sciences. Regional growth, in this period, was defined as externally driven (external demand, redistributive decision of the state, decisions of transnational companies).

1970 crisis caused to eventful changes in economic regimes in the world brought new regional development approach based on local production dynamics. After 1970 crisis, success stories were added to issues that shape regional development theories and finally success stories became dominant among these issues. While success stories highlighted the role of local factors in development, direct exogenous interventions lost their importance. On the other hand, exogenous interventions supporting local dynamics were also emphasized.

With the increase of highly competitive, borderless environment, due to increasing globalization, knowledge economy became more noticeable and regional development is redefined in this context. While, achieving the capabilities of knowledge based development became the core of theories of regional growth, the importance of local production dynamics lost their dominance. Knowledge, learning and innovation raised their significance in this period and growth dynamics of regional economy were theorized in innovative milieu, learning regions and regional innovation systems. In this period, interventions supporting local dynamics were also emphasized.

The purpose of this chapter is to evaluate the development factors and the increasing emphasis on endogenous factors in growth theories. In this context, firstly macroeconomic literature which always interacts with regional development theories is reviewed. In this context, macroeconomic theories, including classical growth theory, Keynesian theory, neoclassical growth theory and endogenous growth theory, are studied. Secondly, development economics including linear stages and structural changes models are reviewed. Thirdly territorial development theories including economic base theory, growth pole theory, flexible production theory, new industrial district and clustering, Innovative Milieu, learning regions and regional innovation system are reviewed. Each of these theories implicitly or explicitly defines factors effecting growth/ development based on the defined ontological assumptions.

Therefore the review focuses on main assumptions and key development factors of theories and main criticisms directed to theories and significance of raised growth, development factors for regional development literature. Finally, the chapter is evaluated the main growth determinants and increasing emphasis of endogenous factors in regional development

literature. Main findings of the empirical studies are summarized under referred theories and empirical literature summary is given Appendix A.

2.1 Economic Growth

Macroeconomic growth theories have undergone a number of evolutionary stages. First efforts on understanding and explaining economic dynamics was classical economics. Industrial revolution and technological progress which led to new methods of production, and more productive economies activated theorizing efforts to understand and explain economic growth and distribution.

After the 1930 crisis and Second World War, great depression caused to questioning supply driven theories, Keynesian approach replaced classical theories. Neoclassical theory started to develop in late 1950s and early 1960s. Lastly, endogenous economic growth came up with the observation that main assumption of neoclassical theory is not valid in real world.

Classical Growth Theory

Classical growth theory (Smith, 1776), whose primary concern is generating and sustaining economic growth, is based on four basic assumptions (Sowell, 2006; Acemoğlu, 2009):

- Free markets can regulate themselves if left alone, free of any human intervention.

- The prices of the commodities; labor (wages), land (rent), etc. are both upwardly and downwardly mobile.

- The aggregate production in an economy must generate an income enough to purchase all of the economy's output. In other words, supply creates its own demand.

- Savings are equal to the investments.

Classical growth theory which was born and developed during early industrialization period defines growth factors such as labor, capital and land for the early industrial period. Smith's supply-side driven growth model states that output growth is driven by population growth, investment and land growth and increases in overall productivity (Smith, 2007). Smith defines ingredients of these production components as key driving factors as well. Growth, according to Smith, is rooted in the increasing division of labor. The greatest improvement in the productive powers of labor, and the greater part of the skill, dexterity, and judgment with which it is anywhere directed, or applied, seem to have been the effects of the division of labor (Smith, 2007).

Smith's 'division of labor' relates mainly to the specialization, which provides qualitative increase in productivity and quantitative increase through economies of scale. According to Smith, since increasing output permits further division of labor and hence further growth, growth itself could be reinforcing. Smith also sees international trade that increases the size of the market as a factor of growth (Smith, 2007).

Richardo (1817) defines capital accumulation and population growth as growth factors. Labor power is treated as a kind of producible and generated by accumulation process so the only limit to growth can come from other nonaccumulable factors of production (Panico and Salvadori, 2006).

While Smith (2007) takes the concept of absolute advantage in order to export the goods and increasing the size of the market, Ricardo (1817) demonstrates that gains from trade could be made when two countries specialize in the production of goods for which they have

a comparative advantage. In the Ricardian model, production technology differences across industries and across countries give rise to differences in comparative labor productivity.

Classical did not make a distinction between working or productive labor and population. Population considered as productive power completely. Such a distinction made by Marx (1887) as labor power and labor (working itself).

Classical growth theory is significant in terms of regional development theories as it defines basic growth factors. In addition to basic factors, determination of trade based on absolute advantage (Smith) and later comparative advantage (Ricardo) is significant for regional development. Division of labor and technological superiority which are the ingredients of advantages form the first version of human capital and innovation. Argument of specialization found its implication at firm level with flexible production theory.

Table 2.1   Main Assumptions and Key Growth Factors of Classical Growth Theory

Main Assumptions	Key Growth/ Development Factors
• The market is perfect and self-sustaining (market automatically adjusts himself), no intervention is needed, • Flexible prices (prices of commodities, labor, wages and land rent), • Supply creates its own demand, • Government intervention can only be a detriment to the economy, • Factors of production (labor) are perfectly mobile across industries within countries.	• Savings and investment in capital (i.e. improved technology), • Population growth, • Capital accumulation, • Division of labor (specialization), • Technological superiority (Ricardo), • Trade based on differences on absolute advantage (Smith) and later comparative advantage (Ricardo), • Land, • Growth itself.
Main Criticisms	**Implication for Regional Growth/ Development**
• Prices are not as readily flexible downwards as they are upwards, due a variety of market imperfections, like laws, unions, etc., • Demand is not based on production or supply, • Savings not equal the investment, • Free market sometimes causes to crisis and depression and market does not perfectly work during crisis and depression.	• Growth factors for early industrialization period: • Land, • Labor, • Capital, • Early versions of growth factors of modern era • Absolute advantage (Smith) and later comparative advantage (Ricardo), • Division of labor, • Technical superiority, • Declaring out government intervention as detriment to economy (based on free market assumption).

Classical view also defines factors having negative effect on growth. It can be interpreted from classical view that policy, regulation, planning, (government or any) intervention can be detriment to the economy, growth or regional development. On the other hand, due to the laissez faire policies, it was experienced that functioning of free market sometimes lead to unrecoverable errors.

Keynesian Theory

Keynesian economics (Keynes, 1936) that was developed during the depths of the Great Depression criticized classical economics assumptions. Keynes argued that prices are really inflexible, especially in the downward direction. This inflexibility or rigidity of prices results because sellers, both output producers and resource owners are unwilling or unable to accept lower prices (Keynes, 1936). Keynes argues that households can only spend the income that they actually have. If they have less income, then they spend less, less is sold, less is produced, and less revenue is generated (Keynes, 1936). According to Keynes (1936) the lack of flexible prices might also prevent equilibrium in financial markets.

Keynesian theory differs on very essential points from classical theory. The most fundamental difference between these approaches is functioning of the market (Keynes, 1936). Keynesian approach indicates that free market sometimes leads to inefficient outcomes in total and therefore advocates active policy responses by the public sector. So, Keynes offers a mixed economy with a large role of government and public sector

Keynesian economics mainly relies on assumptions of imperfect market and inflexible prices (Keynes, 1936). Unlike supply side driven classical theory, Keynesian economics stresses the importance of effective demand that is derived from the actual household disposable incomes. Besides only a portion of the household income will be used for consumption expenditure purposes. Household savings and investments are based on disposable incomes and the desire to save for the future and commercial capital investments.

According to Keynesian demand side model, consumer income, savings, investment and government spending are key growth factors (Keynes, 1936). Consumer income stimulates demand and so economic growth. Household savings and investments are also based on disposable incomes. Keynes supports greater income equality to put more money into the hands of people in lower/ middle income classes, who are more likely to spend it, which makes the entire economy more productive.

Government spending is also defined as growth factor in Keynesian theory. Palley (1996 and 1997) asserts that Keynesian economics also emphasizes the primacy of investment spending by firms in determining capital accumulation and the rate of technical progress.

Ghosh (2008) mentions that Keynesians argue that savings can be manipulated through government intervention so government involvement -whether by planning, socio-economic engineering or effective demand management - was regarded as a critical tool of economic development.

The assumptions, especially the imperfect market assumption are criticized. Friedman (1968) indicates that government should intervene the business of expanding or contracting the money supply; inflation, unemployment and output would adjust themselves according to market demands. Similarly, Lucas argues the once market do recognize the recession, they quickly takes steps to recover and therefore, government should do nothing but wait the correction out (Lucas, 1976 and 1981).

Table 2.2   Main Assumptions and Key Growth Factors of Keynesian Theory

Main Assumptions	Key Growth/ Development Factors
• Prices are rigid or inflexible, • Markets are imperfect, • Demand creates its own supply.	• Effective demand (consumer income and demand), • Distribution of income • Saving, • Investment, • Government spending, • Government involvement in market - whether by planning, socio-economic engineering or effective demand management.
Main Criticisms	**Implication for Regional Growth/ Development**
• Market recognize the recession, and recover (market is perfect) and therefore, government should do nothing but wait the correction out.	• Assumption of imperfect markets explains regional differences, • Governments can intervene successfully in the cycles of the economy, • Regional convergence can be achieved through economic policy.

The Keynesian thought also influenced government approaches and served as prevailing economic model from the latter part of the Great Depression. This approach provided the rationale for a strong and central role for government to the stagflation of the 1970s. The global financial crisis in 2008, moreover, has caused resurgence in Keynesian thought.

A huge amount of literature advocated to empirical test of this approach. As approach highlights effects of government interventions (spending and fiscal policies), empirical studies mainly concentrated on these two topics; spending (Barro, 1989a; Khan and Reinhart, 1990; Landau, 1983; 1986; Ram, 1986; and Diamond, 1989); taxation (Marsden, 1983; Hanas-Anton, 1987; Koester and Kormendi, 1989; and Skinner, 1987); fiscal policy (Landau, 1983; Kormendi and Meguire, 1985; Barro, 1989; Levine and Renelt, 1992; Easterly and Rebello, 1993; Cashin, 1995).

Keynesian theory and policy have substantial repercussions for regional development approaches and policies. As Keynesian theory and policy were dominant economic model during the born of regional sciences, they affected the regional planning perspective and offered a planned developmentalist perspective in which strong nation state sensitive to inequalities was the main actor of development.

In this period, it was thought that local resources can be activated by plans and this movement can be supported by exogenous investments which will prevent regional inequalities. Planning, direct investment in productive activities, infrastructure development, regulative measures and control over flows (capital, goods, information, and labor) were the policy tools of this era. These policy tools were also used to minimize regional inequalities.

Interventionist policies served as a basis for traditional regional policy and were in force until the 1970s crisis. Due to decreasing resources, nation-states cannot sustain implementation of policies (Eraydın, 2002a). To minimize the welfare state responsibilities new policies were adopted.

Although this approach has been heavily criticized and replaced, implementation of this approach can be seen in European Union regional development policies which use union fund for less developed regions.

Neoclassical Growth Theory (Exogenous Growth Model -Solow–Swan Growth Model)

Solow–Swan growth model (Solow, 1957 and Swan, 1956) is an extension to the Harrod–Domar model (Harrod, 1939 and Domar, 1946) which explains economy's growth rate in terms of the level of saving and productivity of capital.

Neoclassical growth theory has four assumptions; constant returns to scale, diminishing marginal productivity of capital, exogenously determined technical progress and substitutability between capital and labor.

The Solow model firstly focused on only two production factors: capital and labor. The model assumes diminishing return which would have made it impossible to maintain per capita growth for so long just by accumulating more capital per worker. The neoclassical economists of the 1950s and 1960s recognized this problem and amended the basic model to allow the technical change to improve over time (Martin and Sunley, 1998; Barro and Sala-i-Martin, 1999; Kan and Omay, 2006).

The phrase "technical change" is defined as a symbol for any kind of shift in the production function. Thus slowdowns, speedups, improvements in the education of the labor force, and all sorts of things are defined as "technical change" (Solow, 1957). These improvements provided an escape from diminishing returns and thus enabled the economy to grow in per capita terms in the long run (Martin and Sunley, 1998; Barro and Sala-i-Martin, 1999; Kan and Omay, 2006).

In neoclassical models, the growth of capital is dependent on domestic savings, while the growth of labor is dependent upon the natural rate of population growth (Smith, 1975).

Due to the diminishing returns to capital, economy converges towards a steady state rate of growth, so growth can be achieved only in the short-run. Economic policy will affect the steady state level, but only during the transition of economies towards their steady state.

Neoclassical development theorists have emphasized the important role of international trade as a substitute for low domestic aggregate demand. They also argue that the governments should act as the facilitator to promote international trade between economies. In the process of positioning the economy on an autonomous, sustained-growth path the government has to remove barriers to international trade in commodities (Ghosh, 2008).

Key implication of diminishing return to the capital assumption is that income level of poor countries will tend to catch up with or converge towards the income levels of rich countries.

Empirical literature about effects of growth factors defined in neoclassical theory is very limited. Early empirical literature searching factors behind convergence focused on capital and labor accumulation. The findings of these studies suggest that there are correlation between initial income level, per capita saving (Taubman and Wales, 1969) interregional capital accumulation (Romans, 1965; Smith, 1975), interregional labor movements (Perlof, et al., 1960; Smith, 1975) and taxation (Taubman and Wales, 1969) and government expenditures (Romans, 1965). In time factors not mentioned in neo classical theory, such as spillover (of labor, capital, and technology), public capital, infrastructure, transportation capital stock, human capital, knowledge, R&D, innovation etc. are added to analyses to explain the convergence process.

Empirical tests of the theory mainly focused on convergence issue. Starting from 1960s a considerable attention has been drawn to income convergence; the hypothesis is examined first for states and later for regions. While some of the studies provide evidence in support of

income convergence across countries (i.e. Sala-i-Martin 1991; Barro and Sala-i-Martin 1992a; Mankiw, Romer, and Weil 1992, Armstrong, 1995; Lau, 2009), numerous of studies find evidence against convergence hypothesis across states (e.g., Browne, 1989; Garnick, 1990; Barro and Sala-i-Martin, 1991; Blanchard and Katz, 1992; Carlino, 1992; Mallick, 1993; Crihfield and Panggabean, 1995; Glaeser et al., 1995; Drennan et al., 1996; Sala-i-Martin, 1996; Vohra, 1996; and Drennan and Lobo, 1999; Yanıkkaya, 2001; Tunali and Yılancı, 2010). The general conclusion from these studies is that if study focus only countries that are similar in their structural characteristics and that have similar initial conditions will converge to one another (Martin and Sunley, 1998)

In this context, economists have begun to show considerable interest in the question of regional convergence within countries as regions within a nation are much more likely to share similar structural characteristics (Barro and Sala-i-Martin 1999). Like cross country empirical analysis, some studies on regional scale found evidence for convergence (i.e. Barro and Sala-i-Martin (1991, 1992a, 1992b, 1999; Bergström, 1998; Kangasharju, 1998) and some find no evidence of convergence (i.e. Siriopoulos and Asteriou, 1998; Sachs, Bajpai and Ramiah, 2002; Dobson and Ramlogan 2002).

The regional convergence process in Europe has also generated considerable interest in recent years due to the aim of diminishing disparities. There are many studies published recently dealing with this issue using different empirical approaches. Eckey and Türck (2007) reached a conclusion by reviewing literature on convergence in Europe that most studies find a significant, but rather small convergence rate of European regions.

Regional convergence has been empirically tested also for Turkey. Most of the studies show that there is no convergence in Turkey. While Tansel and Güngör (1998) found evidence both for absolute and conditional convergence, Filiztekin (1998) found evidence only for conditional convergence for Turkey. On the other hand a huge amount of studies (Erk, Ateş and Direkçi, 2000; Gezici and Hewings, 2001; Altınbaş, Doğruel and Güneş, 2002; Doğruel and Doğruel, 2003; Gezici and Hewings, 2004; Aldan, 2005) showed that there is no convergence. Besides, some studies (Gezici and Hewings, 2007; Sarı and Güven 2007; Karaca, 2004; Berber, Yamak and Artan, 2000) find evidence even for divergence.

Neoclassical theory with convergence debate directly affected regional growth discourses. Most influential effect of the theory is convergence hypothesis. Convergence hypothesis is significant in terms of regional development for two reasons. One is that if income convergence exists among regions, economic policies and interventions become open to criticisms. Second one is defining factors behind convergence or divergence.

Bernard and Durlauf (1995) assert that the results of regional convergence, and the methods by which they have been obtained, can be questioned. Besides, De Long (1988), Quah (1989) and Romer (1989c) show that there is little evidence of convergence for a broad sample of countries. Moreover almost all convergence studies neglect policies, development programs and government spending. Existing empirical studies do not measure the effect of current interventions to convergence, so even if convergence exists among regions, any conclusion about inexpediency of regional policy cannot be deduced.

The neoclassical model has provided a useful basis for understanding the implications of labor and capital changes on economic performance of nations and regions (Richardson, 1973). The Neoclassical theory is criticized due to erogeneity of technological change and ignored factors in the model. Malecki (1991) and Stimson, et. al. (2006) argued that Neoclassical theory does not adequately explain how productivity, performance and other variables related to the application of labor, capital and technology affect economic development—especially in regional economies

Table 2.3   **Main Assumptions and Key Growth Factors of Neo-Classical Growth Theory**

Main Assumptions	Key Growth/ Development Factors
• Diminishing marginal productivity of capital, • Exogenously determined technical progress, • Perfectly mobile factors of production (labor and capital) within countries.	• Capital (savings), • Labor, • Technological change, • Investment, • International trade, • Initial level of growth (negatively).
Main Criticisms	**Implication for Regional Growth/ Development**
• Technological change is endogenous not exogenous, • Model ignores government, multiple goods, changes in employment, natural resources, geography and social institutions.	• Income level of poor regions will convergence towards the income level of rich regions, • Convergence assertion pushes intervention in a questionable position.

These critics and lack of empirical evidence have promoted the development of new theory which endogenizes technological change and human capital which are considered exogenous in neoclassical theory.

Endogenous Growth Theory

Endogenous growth theory replaced the neoclassical (exogenous) theory in the late 1980 and early 1990s by proposing channels enabling endogenous technological progress and so long run economic growth.

Two generations of endogenous growth theory can be defined, endogenous broad capital models and endogenous innovation models (Crafts, 1996). Furthermore, first generation models -endogenous broad capital models- can be classified into two sets (Martin and Sunley, 1998): (1) those that simply show capital investment as generating externalities (Frankel, 1962; Romer, 1986), (2) successors emphasize human capital and relate technological change to learning by doing and knowledge spillovers (Uzawa, 1965; Lucas, 1988). Based on the definition of innovation, two branches for second-generation endogenous growth theory are defined (Brzezinski and Dzielinski, 2009): (1) product variety models (Romer, 1990); and (2) Schumpeterian growth theory (Howitt, 2008; Brzezinski and Dzielinski, 2009; Segerstrom, Anant and Dinopoulos, 1990; Grossman and Helpman, 1991a; 1991b; 1991c; Aghion and Howitt, 1992; Dinopoulos, 1994). Growth factors highlighted by these branches are summarized in Table 2.6.

Early version of first branch of endogenous broad capital models was developed by Frankel (1962). This model chunked the physical and human capital and does not make an explicit distinction between capital accumulation and technological progress (Howitt, 2008). According to this model production depends on aggregate stock of capital which relies on and saving, therefore long-run growth rate depends on its saving rate.

Romer (1986) criticizes discussions of growth which tended not to emphasize the role of increasing returns and offers an alternative view of long-run prospects for growth. Romer

(1986) explicates growth by capital investment that is assumed to generate externalities through learning by doing and spillover of knowledge. He argues that long-run growth is driven primarily by the accumulation of knowledge by forward-looking profit-maximizing agents.

These models have been heavily criticized. Most critics have attacked the main assumption; the absence of diminishing returns, as having little empirical support (McGrattan, 1998). As mentioned above, the model establishes a strong relation between investment in physical capital equipment and growth (De Long and Summers, 1991). However, high rates of fixed capital accumulation appear to follow, rather than precede the growth (Blomstrom, Lipsey, and Zejan, 1996). Besides, sources of technological change are defined endogenously in these types of model, but as a side effect of other activities rather than the result of deliberate actions by economic agents (Romer, 1994; Crafts, 1995). These issues cause to born of second version of endogenous broad capital models (Uzava, 1965; Lucas, 1988) which introduces human capital as a growth factor and redefine sources of technological change as intended research and education.

Lucas's model (1988) predicts that initial levels of human and physical capital are significant in explaining cross-country differences in per capita output due to the presence of scale effects of human and physical capital. It explains growth in productivity by increasing international trade and domestic absorptive capacity that are the factors enabling diffusion of knowledge which is improved by higher levels of human capital.

Endogenous growth models have faced strong critiques on empirical grounds. Scale effect assumption (increasing in productivity arising from returns to scale) of the first generation endogenous growth theory was empirically tested. Jones (1995a, 1995b and 2002), Young (1998), Dinopoulos and Thompson (1999), Klette (1999), Kang (2002) and Papageorgiou (2002) showed that scale effect prediction of first generation endogenous growth theories is inconsistent. On the other hand, findings of Nelson (1990) and Todo (2003) are consistent with scale effect.

There is huge amount of empirical study which regresses growth rates against variables, mainly capital investment, initial level of human and physical capital, R&D, technological change. Jones (1995a, b) points out inconsistencies between growth trends of productivity and R&D workers in major industrialized countries using time series and panel data. While Jones (1995a, b) and Romero-Avila (2006 and 2009) show that investment and growth is not correlated, Benhabib and Spiegel (1994), McGratton (1998), Li (2002), Dollar (1992), De Long and Summers (1991, 1992 and 1993), Bond, et. all (2004) and Madsen (2002) show that the long run relation between growth and investment is consistent with broad capital theories.

Due to the dissatisfaction with the empirical performance of the broad capital theories, they were largely replaced by second-generation endogenous growth theories that explain long-run growth by focusing on technological progress and R&D (Jones, 1995a; Aghion and Howitt 2006; Howitt, 2008; Acemoğlu 2009; Brzezinski and Dzielinski, 2009). In these models technological progress results from the search for innovations that are undertaken by profit-maximizing individuals.

Product variety model (Romer, 1990a), that is the first version of second generation endogenous growth model, sees technological progress, capital accumulation and international trade as main growth factors. The model highlights research as leading factor to expansion of a variety of new products, but not necessarily better quality products, which increases an economy's production potential (Howitt, 2008; Brzezinski and Dzielinski, 2009, Segerstrom, Anant and Dinopoulos, 1990; Grossman and Helpman, 1991a; 1991b, 1991c; Aghion and Howitt, 1992; Dinopoulos, 1994).

Romer (1993) sees large and small discoveries essential for sustained economic growth and expresses that no amount of savings and investment, no policy of macroeconomic fine-tuning, no set of tax and spending incentives can generate sustained economic growth

unless it is accompanied by the countless large and small discoveries that are required to create more value from a fixed set of natural resources. Similar to Lucas, Romer (1990a) explains growth in productivity by increasing international trade and domestic absorptive capacity.

Like first generation theories, second-generation theories predict that highly populated countries should grow faster because of scale effects (Jones 2005). This prediction states that larger economies grow faster because large markets allow profit-maximizing firms to produce a large number of intermediate goods, which raises productivity, expands the possibilities of production and generates growth. Scale effect prediction of the first version of innovation-based growth theories was falsified by Jones (1995). In response to critiques, second version of R&D based theory was developed.

Second branch of endogenous innovation growth theory (Segerstrom, Anant and Dinopoulos, 1990; Grossman and Helpman, 1991a, 1991b, 1991c; Aghion and Howitt, 1992; Dinopoulos, 1994) is the developed version of Schumpeterian entrepreneurial innovation and creative destruction model (Schumpeter, 1939 and 1942).

According to Romer (1990a), research leads to the expansion of a variety of new, but not necessarily better quality intermediate products, which increases an economy's production potential. On the other hand, Schumpeterian growth theory focuses on quality-improving innovations that create improved versions of old products in a process that resembles Schumpeter's creative destruction (Aghion and Howitt 1998, Aghion and Howitt, 2006; Dinopoulos and Şener 2007; Howitt 2008).

Schumpeter (1942) picked up the role of the entrepreneur in growth and contents that innovation by the entrepreneur leads to creative destruction, as innovations cause old inventories, ideas, technologies, skills, and equipment to become obsolete. This innovation and creative destruction improves the standards of living for everyone and generate (irregular) economic growth.

Endogenous innovation growth models which assume that the rate of technological progress is proportional to the level of R&D investment emphasize the technological improvements arising from deliberate and intentional innovation by producers.

Endogenous economic growth deal with such issues as knowledge, innovation, technological progress, R&D, international trade and government policies and spending, financial markets and local absorption capacity.

Aghion and Howitt (1992) argue that both the average growth rate and the variance of the growth rate are increasing functions of the size of innovations, the size of the skilled labor force, and the productivity of research and decreasing functions of the rate of time preference of the representative individual.

In Schumpeterian endogenous growth theory, purposive and profit-seeking improvements in technology are the main force behind rising standards of living. The incentive for firms to undertake research and development is the possibility that new products may earn temporary monopoly profits (Romer 1990; Grossman and Helpman 1991; Aghion and Howitt 1993).

Schumpeterian models of economic growth have analyzed the long-run growth and welfare effects of a variety of government interventions. Policy instruments such as R&D, production, and trade taxes cum subsidies change relative product and factor prices and generate shifts in economic resources between consumption and R&D activities.

Sources of growth by branches of endogenous growth theory are summarized in Table 2.4. Table 2.5 summarizes main assumptions and key growth factors of endogenous growth theory.

Table 2.4   Endogenous Growth Theories and Source of Growth

Endogenous Growth Theory and Author	Source of Growth
Capital investment (Frankel, 1962; Romer, 1986)	• Saving, • Investment in physical capital equipment, • Accumulation of knowledge by forward looking profit maximizing agents, • Population, • Technological change by intended research and education.
Human capital (Lucas, 1988; Rebelo, 1991)	• Initial level of human and physical capital, • International trade, • Domestic absorptive capacity, • Spillovers from education and training investments by individual agents, • Diffusion of knowledge, • Population.
Product variety model (Romer, 1990a)	• Research by profit maximizing individuals for new products, • International trade, • Capital accumulation, • Population.
Schumpeterian endogenous innovation (Howitt, 2008; Brzezinski and Dzielinski, 2009; Segerstrom, Anant and Dinopoulos, 1990; Grossman and Helpman, 1991a; 1991b; 1991c; Aghion and Howitt, 1992; Dinopoulos, 1994).	• Technological progress by producers, • Purposive and profit seeking innovations innovation, • Local absorption capacity (technological diffusion, transfer, and imitation), • Competition, • International trade, • Government interventions (protection of intellectual rights, taxation, financial regulations, investment in R&D).

Empirical literature about endogenous growth theory has focused on falsifying convergence prediction of neo classical theory rather than verifying prediction of endogenous growth theory. Growth economists defend the endogenous models using the argument that the exogenous models are not able to explain why technology, the engine of growth, grows at different rates across countries (Cavusoglu and Tebaldi, 2006).

Table 2.5   Main Assumptions and Key Growth Factors of Endogenous Growth Theory

Main Assumptions	Key Growth/ Development Factors
• Growth is based on technological innovation (introduction of new products and processes).	• Technological progress by producers, • Purposive and profit seeking innovations innovation, • Local absorption capacity (technological diffusion, transfer, and imitation), • Competition, • International trade, • Government interventions (protection of intellectual rights, taxation, financial regulations, investment in R&D).
Main Criticisms	**Implication for Regional Growth/ Development**
• Overwhelmingly abstract theorizing and failure to attend to the social, institutional, and historical contexts.	• Introduces soft factors (i.e. learning knowledge, absorptive capacity).

Endogenous growth theory has evolved by considering criticisms directed to it. Theory started with endogenizing technological change, due to its flexibility of adopting other factors, the theory has adopted several growth factors.

The endogenous growth models challenged the old neoclassical model by emphasizing the role of endogenous factors (i.e., capital investment, human capital stock, R&D activities, innovation, knowledge and diffusion of knowledge) as the main engines of economic growth.

In other words, long-run growth is not driven by some exogenous process rather the long-run growth rate depends on the economic decisions of economic agents (households and firms). Public policy measures that effect preferences of households (i.e. taste of saving) and firms (i.e. taste of investment in R&D) are potentially capable of affecting the long-run growth rate.

Implication of endogenous growth theories to regional development theories and regional growth is very significant. With the introduction of soft factors (i.e. learning knowledge, absorptive capacity) to growth theories, regional development theories borrowed soft factors and adapted to regional development theories. These developments in the regional/ territorial development discourses can be named as breaking point because hard factors lost its significance and these factors are used to explain growth differences and shaped regional policies.

Development Economics

Development economics investigates the causes of poverty and low incomes around the world and seeks to make progress in designing policies to achieve greater economic prosperity (Acemoğlu, 2010). Main concern of development economics is achieving sustained economic growth over time that improves the standard of living in developing countries. Development economics employs a multidisciplinary approach by incorporating social and political factors to analyzing and addressing the economic problems of developing countries, particularly chronic poverty.
Development economics involves the creation of theories and methods that aid in the determination of policies and practices and can be implemented at either the domestic or international level (Arndt, 1981).

Contreras (1999) argues that development economics is an extension of both political and traditional economics. Development economics derived from traditional theories, but development economics has combined relevant concepts from traditional economic analysis with a broader multidisciplinary approach derived from studying the historical and contemporary development experience.

Development economics focuses on methods of promoting economic growth, structural change and improving the wealth of potential for the mass of the population, for example, through health and education and workplace conditions, whether through public or private channels (Clive, 1987). Unlike in many other fields of economics, approaches in development economics may incorporate social and political factors to devise particular plans (Todaro and Smith, 2008)

This section provides information about factors of development mentioned in development economics, using the two schools of thought: linear stages of growth theory and structuralism. In 1950's and 1960's, linear stages of growth model was popular. It described the process of development as a series of successive stages. This model was replaced in 1970's by structural change and international dependence models. Structural change model emphasizes the internal process of structural changes that a developing country must go through.

Linear Stages (Big Push/ Take-off)

Linear stages of growth model (Rostow, 1956; 1960 and Gerschenkron, 1962) argues that countries go through the same development stages in the growth process, so suggests that growth pattern can be learned by analyzing prior developing stages in rich, industrialized countries. The stage theory argues that "underdevelopment" in some of the economies will be converted to "development" over time (Ghosh, 2008). Economic development is a linear function of capital formation, technology and time.
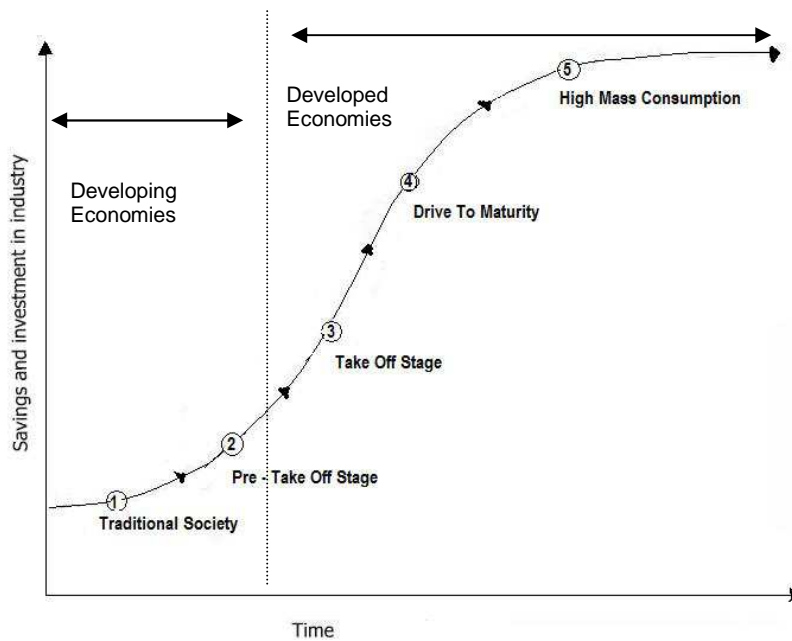
Figure 2.1   Rostow's Five-Stage Model of Development

(Source: After Potter et al., 1999)

The stage theory emphasizes the need for the mobilization of domestic and foreign investment in order to accelerate growth and the role of accelerated capital accumulation.

Several stages of growth models have been developed, Rostow's stages of growth model, however, is achieved dominance among stages of growth models. Therefore, Rostow's stages of growth model reviewed here.

Rostow (1960) explains underdevelopment as the effects of the dualism between traditional economic structures and social structures. In other words, underdevelopment is a result of endogenous factors. Growth was restricted by local institutions and social attitudes, especially those that negatively affected the rate of savings and investment. Therefore, development has to be initiated by transferring western development experiences from the outside. Development requires a process of social, political-institutional, cultural and technological modernization.

Rostow (1960) argues that advanced countries had all passed through a series of stages and reached to self-sustaining stage and argues that economic development can be described in terms of a series of steps through which all countries must proceed (Figure 2.1):

- The Traditional Society,

- The Pre-conditions for take-off into self-sustaining growth,

- The Take-off,

- The Drive to Maturity,

- The Age of High Mass Consumption.

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These stages are based on observations of the sequences of modern development. The idea was of a linear progression to an advanced economy through five stages. The paradigm case was Britain and other countries were portrayed as following in Britain's footsteps (Crafts, 2000).

Traditional society is one whose structure developed with in limited productive function (Rostow, 1960) based on very severely limited technology.

Preconditions for take-off, to Rostow, begins with a more stable political nation and give itself to secular education and with the development of an entrepreneurial class, manufacturing, only a few sectors, develops at this point.

Rostow (1960) defines take-off as a period when the manufacturing sector led growth becomes common and the degree of productive economic activity reaches a critical level which lead to changes in the economic and social structure.

The drive to maturity refers to shift from heavy engineering towards more complex process and diversify of productions. This process leads to reduced rates of poverty and rising standards of living.

The age of high mass consumption refers to the period of contemporary comfort, in which increased resources are allocated to social welfare and security.

While the advanced countries had all passed the stage of take-off and had achieved self-sustaining growth, the developing economies were either in the "preconditions" or "traditional" stage (Figure 2.1).

Table 2.6   Main Assumptions and Key Growth Factors of Big-Push

Main Assumptions	Key Growth/ Development Factors
• Countries want to modernize and so the society will ascent to the materialistic norms of economic growth, • Inevitable adoption of Neoliberal trade policies, • Economic progress fit into a linear system, • Growth becomes automatic by the time it reaches the maturity stage.	• Investment; foreign aid, • Investment; foreign investment, • Investment; own saving, • Political, social and institutional framework.
Main Criticisms	**Significance for Regional Growth/ Development**
• Capital accumulation is not a sufficient condition for development, • Growth much more complicated, • Economic progress does not fit into a linear system, • Rostow's work considers mostly large countries with a large population and with natural resources, • The stages are not identifiable properly, • No growth can be automatic; there is need for push always.	• Defines growth steps, • Define transformation process, • Considers mostly large developed countries like recent regional theories.

The preceding preconditions stage sees investment in social overhead capital, the development of an institutional and legal infrastructure that facilitates investment and innovation and a dynamic agriculture that releases factors of production and feeds a growing non-agricultural labor force (Crafts, 2000).

Among the stages, the main stage is "take-off". The take-off stage, according to Rostow (1960), could only be reached through increasing investment rates, developing one or more substantial manufacturing sectors and creating political, social and institutional framework that promote the expansion of the new modern sector. Investment rates can be increased by employing investment of the country's own savings or through foreign aid or foreign investment.

Significant criticisms have been directed to Rostow's linear stages of growth. Most of the crituqes are originated from Kuznet's (1963) empirical study. Kuznet's major criticisms include:

- capital accumulation is necessary, but not a sufficient condition for development,

- growth much more complicated and take more time than Rostow's assertion which put forward that there is a short time span between take off and maturity (self-sustaining stage,

- the assumption on economic progress fitting into a linear system is false due to empirical evidence,

- Rostow's work considers mostly large countries with a large population and with natural resources, He has little to say and indeed offers little hope for small countries

- Rostow's Model based on American and European history and does not apply to the Asian and the African countries as events in these countries are not justified in any stage of his model.

- The stages are not identifiable properly as the conditions of the take-off and pre take-off stage are every similar and also overlap.

- No growth can be automatic; there is need for push always.

The empirical literature mostly failed to verify Rostow's linear stages of growth. The general conclusion of empirical studies has been that there is no typology for the study of nineteenth century European industrialization (O'Brien, 1986). The literature of European economic history rapidly dropped the Rostovian schema and re-grouped around the idea that there were different paths of development to the modern World (Crafts, 2000 and 2001)

The empirical investigations that failed to identify a take-off in the economic history of countries like France (Marczewski, 1963), or found that Britain appeared to be an outlier and that investment rose by far less than during European industrialization than Rostow supposed (Crafts, 1983 and 1984). Crafts (1983) showed that the British economy did not experience a "take-off" in the last two decades of the eighteenth century. Besides Crafts (1984) showed that there is no dramatic increase in the investment to income ratio once thought to be the hallmark of "take-off".

This linear-stages approach was largely replaced in the 1970s by two competing economic schools of thought – theories of structural change and international-dependence theories.

Structural Changes Models

The structuralists emphasize the structural transformation of underdeveloped economies based on traditional agriculture sector to modern economy based on manufacturing and service sectors and mostly urbanized. In addressing the cause of underdevelopment, structuralist economists focused on dominance of traditional sectors, low technological level, and dependence to developed countries.

It is argued that this transformation from traditional to modern economy enable self-sustained economic growth (Contreras, 1999).

It employs the tools of neo-classical price and resource allocation theory and modern econometrics to describe how this transformation process takes place (Easterly, 2002).

Structuralists also emphasize expansion of new technology and methods of production. According to Structuralists technological levels of lagging sectors of the economy enable converging to developed countries.

Structuralists define role of developing economies in international economy as to supply cheap raw material and to purchase finished manufactured goods from industrialized economies. Structuralists argue that trade relations between center and periphery reinforced higher levels of development in the center and so free trade could actually be harmful to less-developed nations (O'Toole, 2007).

The modern sector was maintained not through internal innovations and advancement but by purchasing new technology from the developed countries. Therefore, modern sectors of developing economies become dependent on developed countries. Structuralists argued that economic growth had to stem from internal demands.

A dominant underlying theme of structuralism, therefore, was the notion that underdeveloped economies were characterized by failures of the free market, and this implied that state intervention to correct these failures was essential for development (O'Toole, 2007). So, the structuralists argued that the structural changes needed to bring about economic development could only be achieved by state fiscal (taxes, tariffs and government spending) and monetary (money supply and interest rates) intervention.

In addition to the interventions on market by regulative tools, according to structural changes approach only state-owned enterprises could generate and manage the sizeable investments necessary for industrialization (O'Toole, 2007).

To sum up, a set of interrelated structural changes are needed to make the transition from traditional economy to a modern one. These changes include changes in:

- Composition of consumer demand,

- International trade,

- Resource usage,

- Production,

- Socioeconomic factors such as urbanization and

- The growth and distribution of the population (Easterly, 2002).

Two well-known representative models of structural change models are two sector model (Lewis, 1954) and patterns of development approach (Chenery, 1960; Chenery and Taylor, 1968).

Two sector model explains the growth of a developing economy in terms of a labor transition between two sectors, the capitalist sector and the subsistence sector. According to Two

sector model agrarian societies consist of large amounts of surplus labor and surplus labor can be transferred to urbanized sectors to encourage the development of an urbanized industrial sector.

According to patterns of development approach, different countries reach to wealthy level by following different path. The pattern that a particular country will follow, in this framework, depends on its size and resources, and potentially other factors including its current income level and comparative advantages relative to other nations (Chenery, 1960; Chenery and Taylor, 1968).

Chenery (1960) and Chenery and Taylor (1968) identifie several characteristic features of the development process based on empirical studies using cross-sectional and time-series data:

- The shift from agricultural to industrial production,

- The accumulation of physical and human capital and

- Urbanization.

Table 2.7   Main Assumptions and Key Growth Factors of Structural Change Models

Main Assumptions	Key Growth/ Development Factors
• There is labor surplus in rural areas, and full employment in urban areas (two sector model), • Rate of labor transformation and employment creation is proportional to modern sector capital accumulation (two sector model), • diminishing returns in the modern industrial sector (two sector model), • State was the only economic actor with the resources able to run heavy industrial sectors,	• Expansion of the internal industrial and service sectors, • Improving the technological levels of lagging sectors of the economy, • Internal demand, • State fiscal intervention (taxes, tariffs and government spending), • State monetary intervention (money supply and interest rates), • State owned enterprises, • Internal demand, • The shift from agricultural to industrial production, • The accumulation of physical and human capital, • Urbanization.
Main Criticisms	**Implication for Regional Growth/ Development**
• Main Assumptions do not fit the institutional and economic realities of most contemporary developing countries, • Urban development at the expense of rural development can lead to a substantial rise in inequality between internal regions of a country.	• Sectoral changes and international relations for growth, • Regional development can vary according to both endogenous and exogenous factors, • Endogenous and exogenous constraints on regional development, • Government intervention needed for structural change.

Structural change approaches were highly criticized for their assumptions, theoretical frameworks and by-product of defined growth pattern. First of all, emphasis on urban development at the expense of rural development which can lead to a substantial rise in inequality between internal regions of a country was criticized. The assumption of two sector model on labor surplus of agrarian societies was also criticized. The patterns of development approach was criticized for lacking a theoretical framework (Todaro and Smith, 2006).

Structuralist approach which is also known as import substitution has been employed in many countries, including Turkey, to encourage industrialization but their prescriptions were not successful in many cases (Contreras, 1999). But later, it was noticed that government-led initiatives to industrialize could not effectively create the most important phase of industrialization relating to heavy machinery and plant installation (Contreras, 1999).

Contreras (1999) argues that empirical structural change analysts emphasize both domestic and international constraints on development; while the domestic constraints include economic as well as institutional constraints; international constraints include access to external capital, technology, and international trade.

Although structural change models argue that certain patterns occurring in almost all countries during the development process can be identified, empirical studies on the process of structural change lead to the conclusion that the pace and pattern of development can vary according to both domestic and international factors, many of which lie beyond the control of an individual developing nation (Contreras, 1999).

These results are very significant in terms of regional development. These results can be interpreted to regional arena as pattern of regional development can vary according to both endogenous and exogenous factors and there are endogenous and exogenous constraints on regional development. Besides, state owned enterprises, government fiscal intervention (taxes, tariffs and government spending) and monetary intervention (money supply and interest rates) that are emphasized for structural change are significant to underline role of government for even regional development.

2.2   Territorial Growth Theories

Regional development paradigm has evolved parallel to the changing meaning of the concepts like science, technical knowledge, and governance. Economic regimes in the world also affected the regional paradigms. Three paradigms are defined in the regional development history spanning from post-war years towards the contemporary world (Eraydın, 2004; Tekeli and Pınarcıoğlu, 2004):

- Second World War – 1970s,

- 1970s – 1990s, and

- After 1990s.

Mode of Regulation	Strong Nation State Welfare State	→ Crisis of Welfare State Increasing Role of Local Government	→ Nation State as a Partner of Global Governance Emerging Actors of Public Sphere (NGO's)
Mode of Accumulation and Production	Fordist Mode of Accumulation Mass Production	1970s Crisis → Flexible Mode of Accumulation Flexible Production	1990 Globalization → Mode of Accumulation in Knowledge Society Flexible Production Innovation
Source of Regional Development	External, State Support	Local Production Dynamics	Knowledge Based Development

Figure 2.2   General Characteristics of Three Regional Development Periods

The first paradigm started with the born of regional sciences in the post-war era and was in force until the 1970s crisis. In this period, it was thought that regional development is arisen from regional external interventions together with regional internal dynamics. Strong nation state was seen as the main actors of regional development and direct investment in productive activities; infrastructure development, regulative measures and control over flows (capital, goods, information, and labor) were the policy tools to minimize regional inequalities.

Economic crisis occurred in 1970s reshaped regional development paradigms. The state lost its privileged position. Source of regional development was seen as internally driven. More importance was given to social factors over development. Supporting local dynamics was the role given to state in this era.

The increasing effect of globalization caused to development of the third paradigm. In the third era, source of regional development is seen as social capital, social embeddedness of economic relations, untraded interdependencies and internally driven technical and organizational innovation

Regional development theories are explained in the following section with reference to these three paradigms.

2.2.1   Traditional Theories

The first paradigm came out with the born of regional sciences in the post-war era when interest in growth economies and regional development disparities increased. The first paradigm was in force until the 1970s crisis. Depression after the 1930 crisis and Second World War caused to born of Keynesian welfare state policies that offered a planned developmentalist perspective in which state was the main actor of development. State acted in order to ensure persistence of Fordist mode of production and accumulation, to minimize the risks causing crisis, and to enhance nation-building process through reducing the regional disparities.

It was assumed, in this period, that the development of a region is essentially based on the realization of infrastructure and production investments in that region (Tekeli and Pınarcıoğlu, 2004). Therefore, it was thought that local resources can be activated by plans and this movement can be supported by with exogenous investments which will prevent regional inequalities.

Strong nation state, the main actors of regional development, developed some policy instruments to minimize regional development disparities. Direct investment in productive activities, infrastructure development, regulative measures and control over flows (capital, goods, information, and labor) were the used policy tools to minimize regional inequalities.

Source of regional growth was defined as externally driven (redistributive decision of the state, external decisions of transnational companies) and factors of regional development were outlined as large scale investments, economies of scale, agglomeration economics, externalities and capital accumulation-investment dynamics, vertically integrated economy, and traded interdependencies (Eraydın, 2004). Therefore, it was thought that regional development dynamics stem out of regional external interventions together with regional internal dynamics.

Private entrepreneurs were therefore not expected to function as the initiators of development. Governments played a major role in the provision of infrastructure, planning, industry promotion and marketing systems. There was a focus on comparative advantage, by promoting cheap land, utility charges and local tax breaks for new businesses relocating or expanding in a region (Stimson, et. al., 2006).

In this period, many theories were developed about regional development and regional planning with the influence of growth economics and geography. As a result of above mentioned epistemological position, efforts during this period were concentrated on creating mega theories that have high level of abstraction (Eraydın, 2002a). In this period reflections of growth dynamics of regional economy were theorized in growth pole theory (Perroux, 1955), and economic base (Alexander, 1954 and Tiebout, 1962). Some theorization efforts were focused on spatial organization to emphasize the location selection problem of the enterprises (Isard, 1969; Alanso, 1964) and location selection of services (Christaller, 1966; Berry, 1964).

Economic Base

Economic base theory (Hoyt, 1954; Douglass, 1955) an extension of international trade theory assumes that regional economic activities are composed of two components: basic (export consumption) and non-basic (local consumption).

In economic base theory, economic base has a multiplying effect and cause to development. Selling locally produced goods and services to consumers outside of the region, generates funds and multiply the effect of the initial increase in the economic base, thereby creating economic development (Stough and Maggio, 1994) that is, the growth of jobs, income, output and value added is created by the multiplier effect (Stimson, et. al., 2006). According to this theory, regional growth is function of increase in demand on export (Tekeli, 2008).

Economic base theory focuses on the demand side of the economy and ignores the supply side, or the productive nature of investment, and is thus short-run in approach. As demand on export is not controlled by region, according to this theory, growth is exogenously defined (Tekeli, 2008)

There is limited number of empirical study testing economic base theory, studies focus on defining economic base multipliers to forecast local service needs without questioning the theory.

Although economic base theory provided support for economic development policies and strategies including import substitution, export promotion, location incentives, natural resource development and many of the strategies that have arisen from economic base theory have been remarkably successful, it receives much theoretical criticism. Engle (1974), for example, characterizes the base model as "woefully inadequate" as a policy model because it does not consider comparative costs, investments, government expenditure and taxation, and wage rates.

Table 2.8   Main Assumptions and Key Development Factors of Economic Base Theory

Main Assumptions	Key Growth/ Development Factors
- All local economic activities can be identified as basic or non-basic, - The basic sector (export consumption) is prime cause of local economic growth.	- Basic sector, - Exogenously defined export demand, - Trade.
Main Criticisms	**Significance for Regional Growth/ Development**
- Overemphasis on the basic sector, - Arbitrary distinction between basic and non-basic sectors, - Oversimplification of national models, - Non-spatial, - Fixed causal relationships, - Ignores capacity constraints, imports, savings, and the balance of payments, - Ignores supply side, - Unreliable estimation of exports.	- Identifies/ emphasizes the importance of most critical local industries, - Indirectly emphasizes comparative advantages of regions.

An investigation on the economic bases of regions leads to questions of what determines the location of industry. So, theorization efforts on spatial organization are also emphasized in this period. As the location selection rules (Alsonso, 1964) attempt to define the location selection rules for industrial enterprises in particular, the Central Place Theory (Christaller, 1966; Berry, 1964) theorizes space on the basis of the distribution of service activities. These theories provide a framework for understanding the role of transportation costs in regional growth and decline.

Growth Poles

Growth pole theory developed around the propositions of Perroux (1950; 1955; 1988) identifies a growth pole as an industry or perhaps a group of firms with an industry. The theory argues that economic development strategy should focus investments on a specific sector -that is the growth pole, or sectors, to initiate propulsive development (Stimson, et. al., 2006).

Perroux's growth pole theory made use of Schumpeterian innovation concept as independent variable to explain growth. In Perroux's (1950) original formulation, a growth pole referred to linkages between firms and industries. "Propulsive firms" are those that are large relative to other firms and generate induced growth through interindustry linkages as the industry expands its output.

Perroux-style growth poles and growth centers are sites of knowledge and information that are sources of new technology and innovation. In essence, local growth in this model is dependent on three sets of processes: large firms, knowledge creation and transfer, and new technology (Plummer and Taylor, 2001a).

Perroux viewed management -by government, large enterprises, or entrepreneurs- as the driver of regional growth.

Table 2.9   Main Assumptions and Key Development Factors of Growth Pole Theory

Main Assumptions	Key Growth/ Development Factors
• Economic growth is spread throughout a growth center's hinterland to lower order cities and localities.	• Concentration, spatial proximity, • New technology, • Large firms, large entrepreneurs, • Knowledge creation and transfer, • Linkages between firms and industries, • Management by government, large enterprises or entrepreneurs.
Main Criticisms	**Significance for Regional Growth/ Development**
• Implementation of the theory cause to balanced vs. unbalanced growth, • Theory is non-rigid and includes uncertainty.	• Development involves polarization, • Growth poles are source of dynamism, • Growth poles generate spread effects, • Growth poles as a source and a diffuser of innovations.

The growth pole concept has been intensively revised, extended and complemented with other modern economic geographical concepts. Depending on the nature of linkages (direct or indirect) as well as the role of spatial proximity of linked activities, the literature was consequently enriched by concepts as industrial complexes, formations, industrial districts and clusters (Harison, 1991).

Growth pole theory was largely abandoned in the 1980s due to growing dissatisfaction with the perceived lack of coherence between traditional notions of growth poles and empirical reality. Many growth pole policies were shown to fail in their intended objectives of inducing new economic growth in lagging regions. Other criticisms also emerged. The growth pole theory is criticized by mainly due to oversimplification of input-output relationships between "propulsive" and "affected" industries, and possible implementation results (unbalanced growth).

The one of the freshest regional development tools of Turkey is growth centres (poles) program which is based on the growth pole theory. This tool is reviewed in Chapter Three.

2.2.2   Transition from Traditional Territorial Development Theories to Endogenous Growth Theories

The economic crisis, occurred in 1970 threatened the old and inefficient order, opened up, as a result of the recovery features of capitalism, new opportunities for new development patterns. Due to decreasing resources, nation-states could not sustain implementation of policies (Eraydın, 2002a). Economic depression led economic development within the framework of the prestige of planning to depreciate rapidly. The state lost its privileged position and distributed his some roles to several units, especially local governments. It became harder to continue with state intervention policies, so the role of state was changed. To minimize the welfare state responsibilities new policies were adopted.

Some SMEs and SME concentrated areas were less affected in the crisis and they were picked up in a very short period and began to grow. Replacement of old and insufficient order with the new development patterns brought the second paradigm in the 1970s. There have been several attempts to theorize the dynamics of territorial regional development. These attempts raise the endogenous nature of growth. Local potential was the core of the regional development literature in the 1970s and 1980s. In this period, economists were interested in explaining contemporary issues via the modification of traditional theories of economic growth (Eraydın, 2003b).

As a result, endogenous growth approach started to affect development theories and models. Source of regional development was seen as internally driven (development from below) and elements of development were defined as development of human capital, vertical disintegration, horizontally integrated economy, and collective entrepreneurship (Tekeli and Pınarcıoğlu, 2004). Social elements also gained more importance over development apart from economic elements.

The economic crisis was considered as the end of Fordism and the emergence of the new form of industrial organization (Glasmeier, 1999; Scott and Storper, 1987). Recent researches on spatial development have emphasized the importance of flexible production and specialization within 'industrial districts' and 'clusters' as a way of achieving and maintaining local economic 'success' and internationally competitive industrialization in developed economies (Brusco, 1982; Sabel, 1989; Piore and Sabel, 1984; Capecchi, 1989; Beccatini, 1991; Storper, 1993). Based on Marshallian ideas and emphasizing hi-tech industry, clusters of flexibly organized, networked firms are seen in this research as being able to respond quickly to economic change in the face of globalization. Main Schools of thought effectual in this period and their derivations are schematized in Figure 2.3.

Figure 2.3   Main Schools of Thought and Their Derivations

Source: Adopted from Cruz and Teixeira, 2007.

Flexible Production Theory

Flexible production systems, like other contemporary theories, was theorized in the changing international order and a globalizing context of intensified competition, rapid changes and demand on diverseness by conceptualizing winner regions and localities which have been loser.

As Plummer and Taylor (2001a) mention flexible-production theory (Scott, 1988; Scott and Storper, 1992; Storper, 1995) blends elements of regulation theory (Jessop, 1990), institutionalist economics (Hodgson, 1988; Veblen, 1904), evolutionary economics (Nelson and Winter, 1982), and transaction costs.

As a model of local economic development, flexibility model is technologically driven and hinges on the local integration of firms through the exchange of goods and information. This integration affords local external economies of scale and scope, minimizing transaction costs (Scott, 1988).

Within the framework, place-based technological leadership is driven by the trust and reciprocity involved in those buyer-supplier relationships, coupled with institutional support and the potentialities of the human resource base of the local labor market.

Flexible production theory also emphasizes the role of small and medium-sized firms on innovation. Flexible production theory emphasizes the role of R&D for developing differentiated and localized products instead of standardized and mass-production-based products.

Several criticisms have been directed to the flexible specialization theory. Criticisms can be summarized as oversimplifying network relationships and ignoring fundamental structural relationships within and outside regional networks (Dawkins, 2003); citing the examples refer to old industries surviving from previous times; ignoring the growing globalization of the world economy; not having true examples in practice (Simmie, 1997) and being a fuzzy concept (Markusen, 1999).

Table 2.10   Main Assumptions and Key Development Factors of Flexible Production Theory

Main Assumptions	Key Growth/ Development Factors
• Flexible workforce, • There exist excellent networks.	• Differentiated and specialized product and production systems, • R&D for developing differentiated and localized products, • Intensive inter-firm networks and vertically disintegrated firms through the exchange of goods and information, • localized pool of technological knowledge and higher skilled workers, • small and medium sized entrepreneurs, • local external economies
Main Criticisms	**Significance for Regional Growth/ Development**
• Oversimplify network relationships and ignoring fundamental structural relationships within and outside regional networks, • Cites the examples refer to old industries surviving from previous times, • Ignores the growing globalization of the world economy, • Being a fuzzy concept.	• Local cooperation for global competition, • External economies, • Proximity and space, • Small entrepreneurs.

New Industrial District

New industrial district theory was built up on Marshallian industrial district concept. Marshall (1890) uses concepts of external economies and agglomeration economies to formulate industrial district idea. Marshall (1890) defines external economies of aggregation of small firms as a pool of skilled labor, the growth of subsidiary industries and a fruitful intercommunication of ideas. He also determines two significant aspects of agglomeration economies; mutual knowledge and trust and the industrial atmosphere as promoter of innovations and innovation diffusion among small firms within industrial districts.

Similar arguments have recently appeared in economic geography. Many of the features of the Marshallian industrial districts (atmosphere, external economies, and the competition–cooperation mix) have been preserved by the further developments but there has also been a progressive detachment from the original concept (Belussi and Caldari, 2009).

Dunford (2009) grouped the forces behind the new industrial districts into two sets:

> The first were a set of economic forces that included: (1) scale economies that result from a high degree of specialization and division of labor; (2) external economies that arise from the existence of shared infrastructures, services and information; and (3) the availability of special skills and the pooling of the workforce. The second were the interactions between the economic and social system that generated a social atmosphere and communities of firms and people conducive to industrial development, whose consideration opened the door to models dealing with the social, cultural, political and institutional foundations of the district model, including analyses of social norms and values, political subcultures, associationalism, good governance, institutional density and performance, conventions, trust, social capital and entrepreneurship. (Dunford, 2009)

Main characteristics of new industrial districts can be summarized as collective pool of knowledge, local skilled labor potential, information exchange facilitated by various forms of social capital, especially the cultural norms of trust, cooperation and reciprocity (Brusco, 1986; Fukuyama, 1995), production for the same end market, regional production organizations and locally embedded relations (Eraydın, 2000; Eraydın, 2004), informal links through cooperative and competitive relationships, broad product range and high specialization, low transaction cost, creativity and social and economic reform, creative environments (Belussi, 1999). Under these conditions historical and socio-economic factors become so important to understand new industrial districts (Mouleart and Sekia, 2003). In sum, industrial districts highlights the role of historical and socio-economic factors for the success (Becattini, 1987; Brusco, 1986, 1992; Dei Ottati, 1994a; Moulaert and Delvainquie` Re, 1994)

A number of critics have questioned the relative importance and future stability of the industrial districts (Harrison, 1992). Eraydın (2001) argues that in the past decade, a limited number of success stories have begun to emerge from developing countries but all these success stories come from regions that are currently internationally competitive.

While most industrial districts enjoyed considerable success within the 1970s and the beginning of the 1980s, the picture changed after the mid-1980s when large companies were initiating an in-depth process of business and production restructuring (Serarols i Tarrés, et. al., 2008).

Thus, Harrison (1994), Cooke (1996) and Staber (1996) questioned the sustainability of growth in these regions and their future development patterns. The results showed that, many new industrial districts were running into trouble (Trigilia 1992; Sammarra and Belussi 2006). Recently, more and more reports on the decline of industrial districts have been published (Håkanson 2005).

Table 2.11   Main Assumptions and Key Development Factors of New Industrial District Theory

Main Assumptions	Key Development Factors
• Proximity enables specialization and exchange of knowledge and information, • Scale economies, • External economies, • SMEs, • Vertical disintegration.	• Cooperation and quality bases competition, • Regional production organizations and locally embedded relations, • Organization of production and the strength of relationships, • local support networks, • skilled human resources, • creativity and social and economic reform, creative environments, • Collective learning capacity, • Flexibility, • The information exchange facilitated by trust and reciprocity, • Local institutions (education and training facilities), • Technological change, progress.
Main Criticisms	**Significance for Regional Growth/ Development**
• Representing success stories of internationally competitive regions, • The rarity of Marshalian industrial district's characteristics (i.e. local allegiance, co-operation, trust relations, and social and institutional solidarity) in modern economies, • Ignoring the significance and effects of the global economy as far as different areas are concerned, • Growth in new industrial districts is not sustainable.	• Industrial districts highlights the role of historical and socio-economic factors for success, • Local factors started to emphasized, • Soft factors are emphasized, • Invisible and immeasurable factors gained significance.

Flexible production theory and also new industrial district theory were evolved by innovative milieu theory (Maillat, 1995; Maillat 1996; Maillat and Lecoq, 1992), with a different emphasis regional innovation system (Cooke, et. al. 1997) and learning region (Florida, 1995) within the globalization era.

Cluster Theory

Cluster concept is originated from Perroux's growth pole which emphasizes new technology, large firms, knowledge creation, concentration, management by government and large entrepreneur. On the other hand, cluster theory has linkages with new industrial districts.

Porter (2000) defines industrial clusters as a geographically proximate group of inter-connected companies and associated institutions in a particular field, linked by commonalities and complementarities. The philosophy behind clusters is that large and small

companies in a similar industry achieve more by working together than they would individually (Nadvi and Barrientos, 2004).

Porter (1998) defines usual member of cluster as group of companies, suppliers of specialized inputs, components, machinery, and services, and firms in related industries, firms in downstream (e.g., channel, customer) industries, producers of complementary products, specialized infrastructure providers and other institutions that provide specialized training, education, information, research, and technical support, trade associations and other collective bodies covering cluster members.

Key features of successful clusters include highly specialized skills, learning, creativeness, innovation, network development, local firm cooperation, collaborative action, rivals, sophisticated customers, new market relations, mutual support, entrepreneurship, conflict solving, lower transaction costs, local social capital, cultural and institutional structure allowing cooperation, networking, special access, special relationships, better information, powerful incentives, and other opportunities for advantages in productivity and productivity growth due to geographic proximity. Eraydın (2005) regroup them under three main headings; the power of networking, socio-cultural and institutional context, and learning opportunities.

Recently, it became more obvious that not all clusters can sustain their growth performance (Amin, 1999; Malmberg and Maskell, 1997; Lyons, 2000; Staber, 1996). Obviously, adjustment to changing conditions is not easy for any cluster. There are several factors that generate difficulties in transformation and degrade competitiveness (Eraydın, 2005). Therefore Cooke asserts that the experience of successful clusters show that they usually emerge and begin to grow because of local dynamics and it is after this stage that governments reinforce and support this growth trend through various institutions and measures (Cooke, 2002).

Subsequently, government interventions to create an environment that supports rising productivity (Porter, 1998) and competitive power (i.e. trade barriers, pricing, providing high-quality education and training); factor conditions ranging from tangible things, such as physical infrastructure to information, the legal system and university research institutes and the investment climate including macroeconomic are also added to key features of clusters to sustain their competitiveness.

There is an intuitive awareness about the raising importance of the theoretical debate on clusters and there is a huge qualitative-based empirical literature, but there is no substantial empirical support of its precise magnitude and evolution (Cruz and Teixeira, 2007).

Empirical evidence demonstrating a strong link between clusters and improved economic performance has been tentative and inconclusive. Moreover, in regions where functioning industry clusters exist, there has been only limited research into the factors that facilitated their creation and growth and how they are used to achieve economic development goals.

It is important to note that cluster theory and cluster-based economic development policies have been criticized. Harrison and Glasmeier (1997) critiqued Porter's cluster theory on two points. First, they claim that cluster development is more appropriate in areas where there is already an existing, diverse economic base that can support new markets and diversification. A second criticism is that industry clusters are only capable of responding to small, incremental changes in technology and market demand. However with larger changes, clusters can be resistant to new information.

Rosenfeld (1997) discusses of some of the general criticism of cluster policies. The major concern is that cluster policies encourage overspecialization in the economy. Secondly, cluster policies are criticized for being more applicable to small, specialized firms, particularly because of the level of trust and cooperation required for a successful cluster. A third criticism of cluster policies is that they only apply to urban areas and that rural areas lack the necessary scale for a cluster. Finally, critics conclude that new telecommunication

technologies are going to remove the need for spatial clustering so that firms no longer receive a competitive advantage from close geographic proximity.

Table 2.12   Main Assumptions and Key Development Factors of Cluster Theory

Main Assumptions	Key Growth/ Development Factors
• Spatial proximity produce advantages, • Informal information spillovers and highly-flexible firm relations generate advantages, • Clusters are constituted by vertical as well as horizontal linkages between firms or actors, • The promotion of clusters will result in improved local economic conditions and outcomes. •	• Local firm cooperation, • Vertical and horizontal linkages between firms and actors, • highly specialized skills, • learning, • creativeness, innovation, • collaborative action, • mutual support, • entrepreneurship, • conflict solving mechanisms, • cultural, and institutional structures allowing cooperation and networking, • social capital, • lower transaction costs, • New market relations.
Main Criticisms	**Significance for Regional Growth/ Development**
• Cluster development is more appropriate in areas where there is already an existing, • Industry clusters are only capable of responding to small, incremental changes in technology and market demand. • Cluster policies encourage overspecialization in the economy. • Cluster policies are more applicable to small, specialized firms, • New telecommunications technology is replacing the need for spatial clustering.	• Spatial proximity • Local factors • Immeasurable, invisible factors • Introduce production from the point of demand side view and introduce innovation

The review of the cluster and industrial district shows that there is no significant difference between these two theories. Both emphasize local firm cooperation, linkages between firms and actors, and cultural and institutional structures.

2.2.3   *Territorial Models Emphasizing Innovativeness*

The increasing effect of globalization caused to development of the third paradigm. In this period agents of former period (the state, the entrepreneur and the individual) are taken but roles of agents are revised. New agents, non-governmental organizations (NGOs) are defined. Multi-level governance approaches involving national, regional and local governments as well as third-party stakeholders (e.g. private actors and non-profit

organizations – NPOs) have increased in importance, compared to previous approaches dominated by central government (OECD, 2010)

Nation-state is considered as a partner of global governance, enterprises or organizations are taken into consideration as the nodal points of both global and local networks. Individuals are embedded in social relations. NGOs considered as a strong partner of individuals and enterprises, besides taking over some of responsibilities that traditionally belong to the state. All agents are considered in relationship with each other.

The global world which is named also as borderless world put hard competition at the center of all development models and so production. Production became dependent on tacit knowledge, collective learning and networks.

Reasons of comparative advantage are defined as historically accumulated advantages, economies of scope, agglomeration economies and shared infrastructure.

Sources of regional development are seen as social capital, social embeddedness of economic relations, untraded interdependencies and internally driven technical and organizational innovation which is defined as incremental and path-dependent.

Endogenous factors raised its significance in this period and growth dynamics of regional economy were theorized in innovative milieu (GREMI - Groupe de Recherche Européen sur les Milieux Innovateurs), learning regions (Camagni, 1991) and regional innovation systems (Braczyk, Cooke and Heidenreich 1998; Cooke and Morgan, 1994).

Innovative Milieu Theory

Innovative milieu theory was developed by GREMI starting from the contributions of Aydalot (1986) and Perrin (1989) during the 1980s. While other territorial development theories arise factors that are interaction on space but do not rise space, innovative milieu theory offers the space as source of innovation and development. The innovative milieu theory is based on relation between actors and their environment; it interprets spatial characteristics to development as the effect of innovative processes and synergies.

According to Malmberg and Solvell (1997), innovative milieu is a place with common behavioral practices and a technical culture within which knowledge can be developed, stored and disseminated. The milieus are argued to have four basic characteristics: (Garlick, Taylor and Plummer, 2007b):

- a group of actors (firms and institutions) that is relatively autonomous in decision making and strategy formulation,

- a specific set of material, immaterial and institutional elements combining firms, infrastructure, knowledge, know-how, authorities and legal frameworks,

- interaction between actors based on cooperation,

- a self-regulating dynamic that leads to learning,

These characteristics generate a localized dynamic process for innovation. In innovative milieu, innovations and innovative actions are the result of a collective, dynamic process of numerous players in a milieu which offers important proxies, oriented infrastructure, social homogeneity, governance, identity, network synergy, promoted linkages, knowledge transformation and learning. Thus, innovative milieu springs up from the interaction of businesses, political decision-makers, institutions and the workforce.

Therefore, according to Maillat (1991) the milieu must be envisaged as an organization, a complex system which is capable of initiating a synergetic process made up of economic and technological interdependencies.

The Innovative Milieu theory stresses directly the innovative capacity of the different members of the milieu which depends on the capacity of learning and thus cultural factors, including social capital, trust and cooperative organization.

Table 2.13   Main Assumptions and Key Development Factors of Innovative Milieu

Main Assumptions	Key Growth/ Development Factors
• Factors supporting innovation profit from the informal contacts and intensive linkages between participants in a local network, • An innovative milieu is a coherent system of firms and organization, • Interaction is a precondition for innovation and cooperation.	• Innovative milieu, • Innovations and innovative actions, • Collective, dynamic process of numerous players • Interaction between actors based on cooperation, • A group of autonomous actors in decision making and strategy development, • Network synergy and promoted linkages • Knowledge transformation and learning capacity geographical proxies, • Social capital and trust, • A self-regulating dynamic that leads to learning, • Oriented infrastructure, • Social homogeneity, • Governance culture.
Main Criticisms	**Significance for Regional Growth/ Development**
• Most of the world's actual high-technology production and innovation still comes from areas that are not usually heralded as innovative milieus.	• The networks that facilitate innovation, • Close cooperation of institutions, • Innovation based partnership.

Empirical studies on innovative milieu theory show that there is positive relation between growth and trust and growth and social capital. Details of selected empirical studies are given in Appendix A.

Learning Regions

Effective globalization in the 1990s caused contemporary capitalism to reach a point at which basis of competition became knowledge and learning. In this process, it is recognized that global economy becomes learning economy. It is argued that the new age of capitalism requires a new kind of region (Florida, 1995). Consequently learning regions have been propagated as future concepts for successful regional development.

The learning economy (Lundvall and Johnson, 1994) highlights learning capability for the success of individuals, firms, regions and national economies.

There is a consensus on that the concept of learning region (Lundvall, 1992; Asheim, 1997; Florida, 1995; Maskell et al., 1998) integrates and refines several theories. The concept of

learning region significantly extends and refines the flexible-production, flexible-specialization model (Plummer and Taylor, 2001a; Polenske, 2008) and integrates innovation systems literature, institutional-evolutionary economics, learning processes, and the specificity of regional institutional dynamics (Mouleart and Sekia, 2003). The learning region model also integrates industrial district, industrial clusters, regional innovation systems and innovative milieu ideas in order to indicate the conditions for building knowledge based dynamic competitive capacities (Morgan, 1997).

Learning region is considered as regional development concept in which the main actors (politicians, policy-makers, chambers of commerce, trade unions, higher education institutes, public research establishments and companies) are strongly, but flexibly connected with each other and are open both to intraregional and interregional learning processes (Morgan, 1997; Boekema et al., 2000; Butzin, 2000; Hassink, 2001; Wink, 2003 and OECD, 2001). Florida (1995) makes a similar definition and summarizes function of the learning regions as collectors and repositories of knowledge and ideas, and providers of the innovative environment.

Learning region takes innovation as an interactive process that integrates social and institutional elements with knowledge economy. Learning region built its advantage through creation, dissemination use and improvement of knowledge which requires knowledge creation institutions and infrastructure (physical, communication and production), intraregional and interregional networks and social capital, skilled human capital to use knowledge and continuous education and training for high skill human capital.

The capacity of both individuals and organizations to engage successfully in learning processes is regarded as a crucial component of economic performance in the knowledge-based economy (Hassink, 2005). The learning region is strongly associated with the role of higher education and educational organizations at the regional level (Goddard, 1998).

There exists huge contribution providing development factors within the context of learning region. These elements can be excerpted from the definitions and contribution to define elements of competitive advantages of learning region. Some selected literatures having large coverage are reviewed below.

Florida (1995) lists the crucial inputs required for knowledge-intensive economic organization provided by learning region as: a manufacturing infrastructure of interconnected vendors and suppliers; a human infrastructure that can produce knowledge workers, facilitates the development of a team orientation, and which is organized around life-long learning; a physical and communication infrastructure which facilitates and supports constant sharing of information, electronic exchange of data and information, just-in-time delivery of goods and services, and integration into the global economy; and capital allocation and industrial governance systems attuned to the needs of knowledge-intensive organizations.

Florida (2002) later added human, social, and cultural capital, both from the point of view of the competence of the available workforce, and quality of life immigrants to a region.

On the other hand, Maskell (1999) proposes five key elements to develop a learning region:

- critical and knowledgeable customers,

- competent suppliers,

- trustful inter-firm relations and networks,

- high degree of intra-industry rivalry,

- good regional receiving system, which helps firms identify and utilize technological innovation.

The OECD (2001), after mentioning that there is no pure learning region, has concluded with ten policy principles for creating learning cities and regions:

- high-quality and well-resourced educational provision,

- supply of skilled and knowledgeable individuals through education and training and the demand for them,

- improvement of organizational learning, both within firms and between firms and other organizations in networks of interaction,

- effective organizational learning,

- resources available to the region (existing industries, educational provision, research facilities, positive social capital and so forth),

- economic and social conditions,

- mechanisms for co-ordination policies,

- strategies to foster appropriate forms of social capital as a key mechanism in promoting more effective organizational learning and innovation,

- participation in individual learning, innovation and wider labor market changes,

- regional strategies agreed with the population of the region to be transformed for learning and innovation.

These principles should be considered while defining growth factors within the context of learning regions.

Innovation and factors contribute to innovation process are always located at the heart of learning region. It is argued that the innovative capacity of the regional firm is directly related to the learning ability of a region (Oughton, Landabaso, and Morgan, 2002).

Learning which is the understanding of existing knowledge or the creation of new knowledge (Eraydın, 2002b) is highly emphasized for the success of learning region. Parallel to this emphasize, education and training needs, commitment to lifelong learning, skills and the availability of skilled workers are stressed These factors offer the potential for the region to gain a competitive advantage.

Knowledge and tacit knowledge are increasingly presented as the crucial factor in the development of both society and the economy. It is increasingly argued that for high value added activities the key regional requirement is not information (codified data) but knowledge and in particular tacit knowledge.

The sharing of the tacit knowledge concentrated in a particular geographical area results in a cross-fertilization of ideas that creates an innovative regional culture. There is a general agreement that in order to develop learning regions more effort needs to be put into promoting inter-organizational flows of information and knowledge (Morgan, 1997).

Networks may be built up specifically to encourage innovation. For example, organizations may form research focused partnerships with their local university. Social entrepreneurs were placed in the networking category, but in reality, they form a link between the networking and the social capital categories, as they perform a brokering role by mobilizing the social capital required to make networks effective.

Capital allocation system and financial market is also emphasized for learning region to facilitate growth of existing firms and the birth of new ones. Florida (1995) argues that the capital allocation system of a learning region must create incentives for knowledge-based

economic organization, for example, by collateralizing knowledge assets rather than physical assets.

Human capital is another critical factor of learning region. Florida (1995) asserts that as the human infrastructure required for a learning region is quite different, the education and training system must be a learning system that can facilitate life-long learning and provide the high levels of group orientation and teaming required for knowledge-intensive economic organization.

Learning region requires physical and communication infrastructure and manufacturing infrastructure. While physical and communication infrastructure facilitates the movement of goods, people and information on a just-in-time basis.

A well-developed physical infrastructure in terms of road, rail, and air links is felt to be an essential prerequisite for the economic development of a region by a number of researchers (Christie and Hepworth, 2001; Cornford, 2000; Florida, 1995; Lever and Turok, 1999; MacLeod, 2000; Malecki, 2002; Schollman, et al., 2002; Wolfe, 2002; Stimson, et. al., 2006).

As well as these hard networks, soft networks in the form of regional norms and conventions that are shared by all the players within a region are also emphasized. Stimson, et. al. (2006) defines the elements of regional learning infrastructure as:

- transportation infrastructure,

- communications and information infrastructure,

- technological and knowledge infrastructure,

- dense business networks and a high trust business environment,

- institutional infrastructure,

- effective information infrastructure,

- existence of agile regional governments,

- existence of agile communities and associations (Stimson, et. al., 2006, p 336)

Usually regional government plays a key role in facilitating the development of a successful learning region, and well founded cooperation between the private and public sectors is critical in building the networking culture required for inter organizational learning (Morgan, 1997). Therefore, it is argued that learning regions should also cover a new model of administration, decision-making and control (Florida, 1995; Kozma, 2010)

Acosta (2001) identified a number of variables that, taken as a whole, can help to determine whether an area exhibits or lacks the profile of a learning region:

- level of spending on research and development by the government, business, and institutional sectors,

- the number of technology patents,

- the number of research groups,

- government attitudes to innovation and the degree of autonomy in R&D policies,

- innovative behavior by entrepreneurs,

- the region's attractiveness to outside operators.

It is hard to find empirical study testing learning region theory; this is also related with eclectic form of learning region theory. There are limited number of studies (OECD, 2001;

Plummer and Taylor, 2001b; and Keeble et al., 1999) testing learning region theory rather than testing factors highlighted by the theory.

Learning region concept has been criticized due to the lack of empirical evidence (Fürst, 2001; Blotevogel, 1999) and at a 2002 OECD conference, it was concluded that at present there are no pure learning regions.

Markusen (2003) criticized the concept as being characterized both by lacking conceptual clarity, rigour in the presentation of evidence and clear methodology, and by difficulties of operationalization. Weaknesses of learning region are listed as:

- Concepts differ in the extent to which they are normative in character, such as the learning region, or based on real situations in regions (Hassink and Lagendijk, 2001),

- The learning region can be considered as an eclectic concept (Fürst, 2001), as it strongly overlaps with several existing theory-led development models and policy-oriented, innovation stimulation concepts,

- The learning region concept does not pay much attention to industry differences and the position of firms in global production networks (Malecki and Hospers, 2007).

Table 2.14   Main Assumptions and Key Development Factors of Learning Region

Main Assumptions	Key Growth/ Development Factors
• Interaction is a precondition for innovation, • Cooperation is better, the closer the actors are to each other, • Regional actors will organize themselves autonomously, and that they take the integral responsibility for regional development.	• Organizational learning, • Globally oriented physical and communication infrastructure, • Mutually dependent relationships, • Strongly, but flexibly connected actors, • Creation, dissemination, use and improvement of knowledge, • knowledge creation institutions (R&D institutions and universities), • Physical, communication and production infrastructure, • Intraregional and interregional networks, • Social capital, skilled human capital, • Continuous education and training for high skill human capital, • Education and training, • Dense business networks and a high trust business environment, • Governance, public or private partnership.
Main Criticisms	**Significance for Regional Growth/ Development**
• Lack of comprehensive empirical evidence, • Lacking conceptual clarity.	• Soft factors (learning, network etc.) emphasized, • Learning infrastructure, • Universities, • Capacity to learn.

Regional Innovation System

Regional innovation system (Braczyk, Cooke and Heidenreich 1998; Cooke and Morgan 1994) blends and combines elements of innovative milieu, learning regions, system of innovation and national systems of innovation.

While shared practices, attitudes, expectations, norms and values which facilitate the flow and sharing of tacit and other forms of proprietary knowledge become the cornerstone of the system of innovation (OECD, 2007), Regional innovation system (RIS) includes system of innovation elements, besides, take into consideration spatial elements.

RISs are seen as a combination of regional characteristics that lead to greater take-up of technology by firms at the regional scale, giving rise to enhanced regional economic development outcomes (Garlick, Taylor and Plummer, 2007b).

RIS aims to success regional development through collective learning and cooperative actions. Main factors highlighted by the regional innovation system are innovation and innovation policy; knowledge, learning and training system; interaction between actors (firms, R&D institutions, universities, etc.); employment; labor division; soft infrastructure; universities; small and large firms, entrepreneurs; trust and regional budget.

Regional systems of innovation may constitute an adequate approach for the analysis of innovation activities if spatial proximity matters and the effect of certain influences are limited to a particular region. The main groups of actors in a region that may have an impact on the innovation activities of a firm are other private firms, public research institutions, supportive services, and the regional workforce (Fritsch, 2002).

The concept of regional innovation system has been discussed in literature in the last decade with contributions from many authors. According to Asheim and Isaksen (2002); Doloreux et al. (2004); Altenburg et al. (2008) there is an increasing focus on regional innovation systems as regions are seen as important bases for economic development through regional networks of innovators, local clusters and cross fertilizing effects of research institutions. The regional innovation system is thus a normative and descriptive approach that aims to capture how technological development takes place within a territory (Doloreux and Parto, 2004).

Freeman (1987) defines a regional innovation system as a network of public and private institutions that through its activity and interaction creates, brings, modifies, and spreads new technologies. From a regional point of view, innovation is a localized process, suggesting that the benefits deriving from localization advantages and spatial concentration through which the process of knowledge creation and dissemination occurred (Doloreux and Parto, 2004). Andersson and Karlsson (2002) suggested that a regional innovation system consisted of two key actors, regional knowledge spillovers and sources of innovation.

Table 2.15   Main Assumptions and Key Development Factors of Regional Innovation System

Main Assumptions	Key Growth/ Development Factors
• Location and spatial proximity matter for innovation activities, • Innovation is basically an interactive process among economic actors, • Companies, research institutions and the public sector interact. These organizations constitute an infrastructure, which functions as a system of innovation.	• Innovation and innovation policy, • Knowledge, learning and training system, • Interaction between actors (firms, R&D institutions, universities, etc.), • Employment, labor division, • Soft infrastructure, • Universities, • Small and large firms, entrepreneurs, • Trust, • Regional budget.
Main Criticisms	**Significance for Regional Growth/ Development**
• Regional innovation systems provides a problem of definition and empirical validation, • Literature is not clear in what way a specific region can be labeled as an innovation system, • Being fuzzy concept.	• Emphasizing relation with public and private institutions, • Necessity of innovation policy, • Territory matters.

2.3   Evaluation: Determinants of Growth

Theoretical debates on growth and development and empirical studies on growth and development, which is summarized in Appendix A, showed that the determinants of growth and development differentiate substantially in different development discourses.

The growth discourses and theories have changed substantially parallel to changes in the economic regimes in the world. Early economic growth theories established primary and fundamental growth factors that affect amount of production and consumption of the produced products. Changes on the production mode, assumptions on functioning of market, role of state, firms and individuals brought new growth factors. Flexible production instead of mass production, quality based competition rather than quantity based, firms and individuals aiming to increase total profit rather individual profit are the characteristics of new theories. Therefore, growth literature evolved from quantitatively measured hard factors to qualitatively measured soft factors.

Regional development theories experienced similar shift. The shift is mainly from the traditional growth theories to regional growth based upon endogenous capabilities and potential of innovation necessitating knowledge creation. Figure 2.4 illustrates the increasing role of endogenous factors in development. Summary of growth determinants by theories is given in Table 2.16

In the first period, regional development was accepted to stem out of external interventions together with internal dynamics of the region. External interventions can activate internal potentials and led to development. In this period, investments and incentives of state, large

scale infrastructure and manufacturing projects sectoral agglomerations were defined as the major means of development.

In the second period, source of regional development was defined as local dynamics and assets such as human capital, vertical disintegration, horizontally integrated economy, and collective entrepreneurship.

Knowledge economy is much more emphasized in the recent decade. The theories centered on intangible factors parallel to growing emphasis on endogenous potentials, contemporary theories see dissemination of knowledge, learning, innovation and innovative environment as the sources of regional development. Role of state to developed the local dynamics and assets are distinctly mentioned in this period.

Characteristics of Paradigm

Strong Welfare State	Crisis of Welfare State, Increasing Role of Local Government	Nation State as a Partner of Global Governance -Emerging Actors of public sphere (NGO's)
• Fordist mode of production and accumulation, • Externally driven, state interventions, • Planned developmentalist perspective, • Exogenous investments to activate local resources, • Large scale investments, • Economies of scale, • Agglomeration economies, • Externalities and capital accumulation-investment dynamics, • Vertically integrated economy, • Traded interdependencies.	• Flexible mode of accumulation, • Flexible production, • Internally driven (development from below), • Development of human capital, • Vertical disintegraton, • Horizontally integrated economy, • Collective entrepreneurship. • Historically accumulated advantages, • Economies of scope, • Agglomeration economies, • Shared infrastructure.	• Mode of accumulation in knowledge society, • Diversified mass production+ flexible production+ innovation, • Internally driven, incremental and path-dependent (technical and organizational Innovation), • Vertical disintegration, • Horizontally integrated economy, • Collective entrepreneurship. • Historically accumulated advantages • Network externalities (local networks, trans-local networks).

Theories/Models

Economic Base Theory	Growth Pole Theory	Industrial Districts and Cluster	Flexible Production Theory	Innovative Milieu	Learning Regions	Regional Innovation Systems
1950	1960	1970	1980		1990	2000

Elements of Regional Development

Economic Base Theory	Growth Pole Theory	Industrial Districts and Cluster	Flexible Production Theory	Innovative Milieu	Learning Regions / Regional Innovation Systems	
• Exogenously defined ex demand • Trade • Basic sector	• Agglomeration on a specific sector • Externalities • Large firms, large entrepreneur • Knowledge creation and transfer • Investment by state	• Cooperation and interdependence of local firms • Social and institutional capacity • Quality based competition • Transmission of tacit knowledge • Trust and reciprocity • The endogenous innovative capacity • Creativeness • Clustering in a specific sector • Social capital • Higher skilled	• Technological leadership driven by the trust and reciprocity • differentiated and specialized production system • Intensive inter-firm networks and vertically disintegrated firms • Local and global embeddedness • Local external economies	• Innovative phys social, economi and political environment • Collective, dyna process of numerous playe • Agglomeration c innovative firms • R&D investmen public administration • Living condition quality	• Learning capacity • R&D institutions and universities • Actors open to intraregional and interregional learning processes • Creation, dissemination use and improvement o tacit and other form of knowledge	• Supportive infrastructure or knowledge generation subsystem • Production structure or knowledge exploitation subsystem • Innovation policy • Knowledge, learning and Training system • Shared norms and values

T R A D I T I O N A L   G R O W T H   E N D O G E N O U S   G R O W T H

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Figure 2.4   Increasing Role of Endogenous Factors in Development

Table 2.16　　Summary of Reviewed Theories: Determinants of Growth

Main Features	Theories	Determinants of Growth	Growth Factors
Market Dynamics	**Classical Growth Theory**	Production infrastructure	Savings
			Population growth
			Capital accumulation
			Trade
			Land
	Neo-Classical Growth Theory	Supply and demand	Saving
			Labor
			International trade
			Initial level of GDP per capita
		Technological progress	Exogenous technological change (technological transfer)
	Endogenous Growth Theory	Production infrastructure	Capital accumulation (physical and human capital)
			Investment in physical and human capital
			Availability of labor
			Scale effect
		Technological progress	Technological progress
			Accumulation of knowledge
			Research
Role of Government	**Keynesian Theory**	Demand and investment	Effective demand (consumer income and demand)
			Consumption and export
			Savings to be used for investment
		Government interventions	Government spending
			Government involvement by planning, socio-economic engineering and effective demand management
	Structuralist Theory	Supply, demand and technological level	Expansion of the internal industrial sector
			Improving the technological levels of lagging sectors of the economy
			Internal demand
		Government interventions	State interventions
			State owned enterprises
	Linear Stages of Growth Theory	Exogenous investment and aid	Investment -foreign aid
			Investment -foreign investment
		Local characteristics and structure	Investment -own saving
			Political, social and institutional framework

Table 2.16 (continued)

Main Features	Theories	Determinants of Growth	Growth Factors
Territorial External Factors	Growth Pole Theory	Scale and agglomeration economies	Agglomeration
			Agglomeration on a specific sector (scale economies)
			Externalities
			Knowledge creation and transfer
		State policies and support	Large firms, large entrepreneurs (creating externalities)
			Investment on physical and social infrastructure by state
	Economic Base Theory	Demand	Exogenously defined export demand
		Production infrastructure	Trade
			Basic sector
New Production system and Spaces	Flexible Production Theory	Production networks, value chains	Trust and reciprocity
			R&D for developing differentiated and localized products
			Intensive inter-firm networks
			Vertically disintegrated firms
			Localized pool of technological Knowledge (tacit knowledge)
			Small and medium sized entrepreneurs
			Locally embedded knowledge
			Local integration of firms to global networks through the exchange of goods and information
			Localization economies
			Low transaction cost (proximity)
		Production organization	Higher skilled workers
			Differentiated and specialized production systems

Table 2.16 (continued)

Main Features	Theories	Determinants of Growth	Growth Factors
Innovation	**New industrial district and cluster**	Production organization	Cooperation and interdependence of local firms
			Institutional capacity
			Organization of production and the strength of relationships
			Quality based competition
			Tacit knowledge
			Trust and reciprocity
			The endogenous innovative capacity
			Creativeness
			Specialization
		Local characteristics	Shared jointly used infrastructure, services, information
			Clustering in a specific sector
			Entrepreneurship
			Social capital
			Higher skilled workforce
	Innovative milieu	Innovation/ R&D capacity	Innovative physical, social, economic and political environment
		Innovation networks	Inter-organizational collaboration based on trustful relationship
			Interaction between actors based on cooperation
			Collective, dynamic process of numerous players
			Agglomeration of innovative firms
			R&D investment by public
			Creating, storing and dissemination of tacit and codified knowledge
			Social capital (trust and civic engagement)
			Skilled human capital
			Living condition, quality

Table 2.16 (continued)

Main Features	Theories	Determinants of Growth	Growth Factors
	Learning regions	Learning capacity	Learning capacity
		Learning Infrastructure	R&D institutions and universities
			Supply and demand for continuous education and training
			Globally oriented physical and communication infrastructure
			Participation in individual learning
			Participation in organizational learning
			Creation, dissemination use and improvement of tacit and other form of knowledge
			Social capital
			Human capital
			Living conditions
			Investment in education and training
			Investment in communication networks
	Regional innovation system	Supportive infrastructure or knowledge generation subsystem	Public and private research laboratories
			Universities and colleges, technology transfer agencies,
			Vocational training organizations
			Innovation policy
		Production organization	Production structure or knowledge exploitation subsystem (firms clustering tendencies)
			Interaction between actors (firms, R&D institutions, universities, etc.)
			Small -large firms (mixed structure)
			Network of public-private institutions
			Innovative capacity
			Shared norms and values facilitate, flow and sharing of tacit and other forms of knowledge

Theories are built up by especially perception and representation of current socio- economic environment; assumptions on society, individual and market; and epistemological positions. Changes in these issues cause to trigger new theories. In terms of growth factors, economic growth and regional development theories developed by making minor modifications to former theories by adding or deducing growth factors, or by splitting some former theories and blending their components. Theories differ from previous periods rarely and only after breaking points. Therefore, boundary between theories is not so clear and making an exact distinction is not possible. Theories slightly vary according to defined growth factors but differ according to emphasized factors.

Theories can be grouped under five headings considering main features of growth factors:

- Theories emphasizing market dynamics,

- Theories emphasizing the role of government,

- Theories emphasizing territorial external factors,

- Theories emphasizing new production system and spaces,

- Innovation based territorial models.

Classical growth theory, neo-classical growth theory and endogenous growth theory can be grouped as theories emphasizing market dynamics. These theories emphasize production infrastructure, supply and demand and technological progress.

Keynesian theory, structuralist theory and linear stages of growth theory emphasize the role of government and highlight government interventions, exogenous investment and aid, supply, demand and technological level.

Early regional development theories, growth pole theory and economic base theory can be named as theories emphasizing territorial external factors. These theories emphasize scale and agglomeration economies production infrastructure, and state policies and support.

Flexible production theory, new industrial district theory and cluster theory focus on new production system and spaces and underline production organization networks, value chains and local characteristics.

Contemporary regional development theories, innovative milieu, learning regions and regional innovation system are innovation based territorial models. Innovation based territorial models emphasize mainly innovation/ R&D capacity, learning infrastructure and capacity, supportive infrastructure or knowledge generation subsystem. Main features of theories and determinants of growth are given in Table 2.17

Table 2.17   Main Features of Theories and Determinants of Growth

Main Feature of Theories	Determinants of Growth
Market dynamics	- Production factors - Supply and demand
Role of government	- Public Expenditure - Government incentive - Government intervention
Territorial external factors	- Scale and agglomeration economies - Accumulation of knowledge - Production infrastructure
New production system and spaces	- Production organization, specialization, networks, value chains - Local characteristics
Innovation	- Innovation / R&D capacity - Innovation Infrastructure and capacity - Supportive infrastructure or knowledge generation subsystem

CHAPTER 3

REGIONAL DEVELOPMENT POLICIES AND PRACTICES IN TURKEY

Regional policies have shaped up by recognition of regional problems, regional development paradigms and economic conjuncture. Regional policies of countries changed much as a result of changes in these factors.

Regional policies were born in most countries in the 1950s and 1960s. Keynesian development approach was dominated during the born of regional sciences and affected the regional development policies all over the world until 1970s crisis.

Increasing regional disparities were recognized as main problem during this period. The principal objectives of regional policies were greater equity and balanced development during the period. In this period, regional development theories emphasized exogenous interventions. It was assumed that government intervention could alter demand conditions in the lagging regions. The main policy tools were the large-scale public investments having redistribution effect.

Interventionist policies served until the 1970s crisis. The economic crisis occurred in 1970 lead to changes in global economy and increased regional inequalities. After these developments, regional policies in most of the countries evolved rapidly to address this new challenge during the 1970s and 1980s. The focus was extended from reducing disparities in income and infrastructure to reducing disparities in employment as well (OECD, 2010). Regional development paradigm of the era highly emphasized flexible production based on local dynamics and assets. This caused the employment of direct support to firms, subsidies and incentives supporting local assets and dynamics.

From the immediate post-war period until the late 1980s, regional policies predominantly focused on regional investment aid and infrastructure support, with policy interventions heavily targeting designated (often lagging) aid areas (OECD, 2009a).

Poor outcomes of regional policies and the increasing effect of globalization caused to development of the third paradigm. In this period, competitiveness based on innovation gained significance.

Regional policies have evolved from a top-down; subsidy-based group of interventions designed to reduce regional disparities, into much broader policies designed to improve regional competitiveness (OECD, 2010). General policies have focused to support for endogenous development and the business environment, building on regional potential and capabilities, and aiming to foster innovation-oriented initiatives. Increasing attention has shifted to growth and competitiveness. Besides improved governance, especially decentralization and regionalism, is a regional policy goal in some countries

To sum up, the old paradigm policies are top-down, aid-based, investment-oriented, and targeted at designated problem regions while the new stream of policies are implemented with multi-level government co-operation, programme-based and targeted at the entire

country (Yuill et al., 2008). However it can be argued that the old paradigm policies, which target aid at traditional problem regions, generally remain significant, as seen in some countries. In response to globalization pressures and trends in decentralization, over time new paradigm regional policies which include specific infrastructure support, measures to promote entrepreneurship and innovation, education and training, culture and the environment have somewhat replaced and been added to traditional regional policies (OECD, 2010). The aim is to exploit the potential of endogenous assets and local networks specific to the locality.

In the regional policy arena, Turkey experienced similar progress with regional policy described above. The following sections include historical progress of regional policy in Turkey and policy tools employed in Turkey.

3.1 Historical Progress of Regional Policy in Turkey

Since the early Republican period, regional policy of Turkey has been greatly affected by not only the internal economic and social developments but also and the rise of new development paradigms pertaining to regional development and the requirements of European Union membership.

The evolution of regional policy and practice in Turkey can be analyzed with respect to six periods. These are:

- 1923 - 1950: Maturing period for nation and the period of estatism,

- 1950 - 1960: Institutionalization of regional development,

- 1960 - 1972: Emphasis on regional planning and development,

- 1973 - 1980: The rise of province based planning and development,

- 1980 - 2000: Initiation of neo-liberal policies/ emphasis on endogenous growth,

- After 2000: Europeanization and localization.

3.1.1 1923 - 1950: Maturing Period for Nation and the Period of Estatism

The period between 1923 and 1950s was maturing period for the newly founded Republic following the War of Independence. Due to the impacts of perpetual battles, entire country had characteristics of poverty and underdevelopment.

The first fifteen years of the new republican regime was characterized by deep political, administrative, social and cultural reforms. To correct the disappointing economic performance in the 1920s and offset the adverse impact of the world economic depression, Turkey instituted a new set of economic policies in the early 1930s, which placed a heavy emphasis on import-substituting industrialization (Celasun and Rodrik, 1989). The externally imposed tax and tariff constraints so called capitulations effectively limited domestic policy initiatives to redesign the foreign trade and fiscal regimes for an improved management of the national economy were largely removed by 1929.

The Great Depression began in 1929, gave birth to the need for revision of economic policy. The statist, interventionist and protectionist policies had started to be implemented in all over the world.

In the mid-thirties, the government formulated an official ideological position, called estatism (statism). This policy was a middle way between comprehensive planning and market economy system.

In this context, the new Republic just focused on overall development and restructuring (Kepenek and Yentürk, 2001; Keles, 2006, Elmas and Demirel, 2010) to create a national economy by means of redistribution of public services and industrial investments.

On the other hand, Tekeli (1998) and Göymen (2005) argue that there were masked regional policies. In this period two industry plans were prepared. Major investment projects with regional concerns were implemented within the framework of the first industrial plan in the 1934-1938 period. The attempts to implement a second industrial plan during 1938-1944 were disrupted by national defense concerns connected with Second World War.

In the early years of the Republic, İzmir, İstanbul and regions that were close to these cities were observed as the most advantageous regions, In this period the definition of new borders of the state caused East and South-East Anatolian regions to lose their previous economic linkages (Göymen, 2008)

The deconcentration of population and large scale industries and dispersion to different regions of the country can be seen as the main strategy in terms of regional policy; which can be seen in decisions of moving of the capital from İstanbul to Ankara; the establishment of industrial enterprises in Central Anatolia and inner Aegean regions outside İstanbul and Marmara region (Eraydın, 2001 and Keleş, 2006) and the development of a railroad system that connected different parts of the country (Eraydın, 2001). Göymen (2008) argues that establishing industries in remote parts of Anatolia did not make much economic sense then but provided the initial impetus for the later emergence of some centers of growth (e.g. Kayseri, Eskişehir, Zonguldak, Karabük).

Although the state tried to disperse public investments to different regions of the country, especially to Eastern regions since they were more depressed, this could only be partially realized (DPT, 2000).

At the end of this period, Turkey obtained access to Marshall Plan aid which shaped domestic policy and economic performance. This aids significantly affected the development pattern and geographical distribution of production and population.

Source of development, in this period, was seen exogenous and policy instruments were public large scale industrial investments and infrastructure investments.

3.1.2   1950 - 1960: Institutionalization of Regional Development

The Second World War had brought immense destruction to Europe. Every participating country was economically exhausted after the war, but high and sustained economic growth was experienced. Economic recovery was helped by the changes in government policies. After the Second World War, most of European countries tried to stimulate the economic growth of their own countries by more government investments.

On the other hand, the Second World War had serious repercussions necessitating the initiation of a new period in the socio-economic and spatial development of Turkey. The state couldn't support investments any more due to shrinking resources so as opposed to the previous period, the economic planning approach by the government was relatively weakened and priority was given to the private sector to flourish. So it is argued that Turkey experienced first liberal policies in the period of 1950-1960 (Elmas and Demirel, 2010).

Public investments were directed to small cities in Anatolia but private sector investments whose priority was maximizing profit rather than reducing regional disparities were concentrated in İstanbul and Marmara region (Kuruç, 1999).

Low effectual and unsustained public investments in the different regions of the country, especially to the eastern regions and investment pattern of private sector caused the emergence of serious regional disparities in this period. In addition to this investment pattern,

mechanization of agricultural production led to migration of population from rural areas to urban centers (Göymen, 2008). All these developments resulted in the shift of emphasis from regions to urban nodes and from regional inequalities to inequalities between social groups and encouraged the establishment of a regional policy to reduce regional and social inequalities within the country after the rise of economic crisis in 1957 (Eraydın, 2001).

Regional planning practice in Turkey is considered to have started in this period as a response to the major wave of urbanization that had taken place in the 1950s. In fact, the concept of regional planning was introduced by foreign experts who were invited to work on the urbanization problems of İstanbul (Milli Güvenlik Kurulu Genel Sekreterligi, 1993), In 1955, concerning the issues related to the industrial district of İstanbul and the construction of the first suspension bridge, regional plans encompassing the broader impact area were proposed to help preventing the adverse effects on transportation networks, infrastructure and settlement. In accordance with this approach, the Directorate of Regional Planning Science Board was set up in 1957 under the Ministry of Public Works as the first governmental unit responsible for regional planning in Turkey.

Similarly regional policy began in most OECD member countries in the 1950s and 1960s. Theoretically it was assumed that government intervention could alter demand conditions in the lagging regions. The main instruments used were wealth redistribution through financial transfers by the national government accompanied by large-scale public investments, especially in lagging regions (OECD, 2010).

To sum up, origin of regional growth, in this period, was seen exogenous and policy tools of this era were low effectual public investment, private investment which was not managed in the period and partially regional planning.

3.1.3   1960 - 1972: Emphasis on Regional Planning and Development

Although there were no significant changes in World economic and regional policies configured after the Second World War until 1970s crises, Turkey experienced a serious transformations in the political and economic development arena in the 1960s.

The 1960s designated new Constitution and "the planned period". In fact, it was an attempt to rationalize the growth process and to avoid the ups and downs in the economy as it was experienced in the earlier period. Turkey has aimed its economic and social development through Five-Year Development Plans (FYDP), which also set regional policies to reduce regional disparities and establish economic and social balances.

Implementation of maturing planning system and institutionalization of new national development approach with strong emphasis on economic development was the main characteristics of this period.

In terms of regional policy and planning, the period between 1960s and 1970s is significant for establishing planning system and institutions responsible for both planning and regional development. State Planning Organization (SPO), established in 1961, institutionalized the practice of five-year development plans (FYDPs) and has become the primary institution dealing with regional planning affairs in Turkey.

The 1960-1972 period covered the First and Second FYDPs. First and Second FYDPs clearly gave main responsibility in ensuring regional stability to state. Accordingly, state would direct social services and facilities to underdeveloped regions. State-owned economic investments and infrastructure investments would be speed up development of these regions.

The First FYDP (1963-1967) underlines regional policies within national development. In this framework, remarkable planning projects for particular regional spaces where there were considerable social and economic potentials to be incorporated in national development. The

importance of this first plan was to be mentioning concepts of equal opportunities and regional equality (Tekeli, 1981; SPO, 1968).

The context of the regional policies and regional plans prepared in this period were consistent with the import substitution policy that became the basis of industrialization in the 1960s. The plans mainly tried to define the industries that can have comparative advantage in the domestic economy and put limited emphasis on export promotion (Eraydın, 2001).

In this period, the regional policies and plans were in compliance with the import-substitution policies of the period, which formed the basis of industrialization process of Turkey until the 1980s. Similar to former period, state was the main actor and state-led regional policies were developed in this context.

The regional development projects were prepared for East Marmara, Antalya, Çukurova, Zonguldak and Keban regions during the 1960s. As the distribution of regional development projects showed, most of the planned regions were either relatively prosperous ones or the regions with certain potential for development (Eraydın, 2001).

However, political and economic problems of the country together with the administrative problems encountered in implementation hampered the full realization of these plans as foreseen in the planning documents (DPT, 2000; DPT, 2006c).

On the other hand, Second FYDP aimed to integrate spatial considerations into national economic objectives and institutionalize the spatial perspective within national development planning. The Second FYDP (1968-1972) states that backward regions should be supported by state investment and subsidies in order to sustain a balanced national development. The Second FYDP proposed different path from the first plan. The proposed method aimed to constitution of a "growth centre" within backward regions by state investments. However, although these policies brought about the development of various industries in the country, at the same time, they led to an increase in unemployment due to the capital intensive nature of most investments (Eraydın, 2001). This process together with high migration from rural areas to urban centers due to high agricultural unemployment caused by Marshall Plan deepened the gap between the eastern and western parts of the country, as well as creating a new duality between the rural and the urban.

Table 3.1   Regional Development Principles, Policies and Tools (1960-1972)

Principles	Goals	Approach and Policies	Tools
• Diffusion of economic development into regions • Regional economic integration • Concentration on population problems caused by rapid urbanization	• Balanced urbanization • Inter-regional balance (in terms of public services and income distribution) • Efficiency of investments • Balanced regional development for social equality	• Regional planning • Indirect regional planning provincial planning • Growth poles	• Financial incentives • Investment based precaution alternatives for underdeveloped regions • Tax reductions

Source: Adopted from DPT, 2000

As a response to this situation, implementation of Priority Regions in Development (PRD) was started. Regions at South – East and East Anatolia were declared as PRD by the decision of the Council of Ministers in 1968, and since then, investment incentives have been mainly assigned to these regions. In this way, the emphasis in public investments shifted from growth centers to PRD (Göymen, 2008). However, level and methodology for definition of PRDs has been one of the discussion subject; as Göymen (2008) mentioned PRDs were defined at provincial level instead of regional scale, and in the determination of them, political criteria rather than economic ones prevailed.

In the First FYDP, any measure to encourage the private sector to invest in lagging regions not considered, but some tools such as organized industrial zones to facilitate the local entrepreneurs to invest in their respective regions are proposed in the Second FYDP.

Like previous period, source of regional development was exogenously defined. Regional development tools of this period were state investment and financial incentives aiming at private sector investments.

3.1.4   1973 - 1980: The Rise of Province Based Planning and Development

With the effect of the crisis in 1970s, concept of economic efficiency has gained importance in all over the world. Therefore, arguments emphasizing the attempts to overcome regional inequalities in a short period of time would result in economically inefficient distribution of resources and also in the slowing down of capital accumulation and national economic development were gained significance (Ergin, 2002).

Economic depression led the state to lose its privileged position and distribute his some roles to several units. It became harder to continue with state intervention policies, to minimize the welfare state responsibilities new policies were adopted. The role of state was redefined as influencing industrial location decisions of private sector through subsidies and incentives.

In this period, while national development policies came to the fore and reducing regional disparities lost its significance, the focus of regional policy was extended from reducing disparities in income and infrastructure to reducing disparities in employment as well (OECD, 2010). In this course, regional policies evolved rapidly to address geographical concentrations of unemployment which experienced in many OECD member countries.

Although there was no change in the economic policy in Turkey, 1970s denoted important changes for Turkey in terms of regional policies. Firstly, the emphasis on public sector investments was faded in favor of private entrepreneurship. The regional development is seen as a cooperative effort of defining natural resources of regions and supporting the most advantageous fields of activity in these areas. But, regional planning lost its significance; instead, incentive schemes were defined as the major tool for reaching the regional objective of convergence (Çiçek and Eraydın, 2012).

These developments can be monitored in the policies proposed in Third FYDP. With the introduction of the Third FYDP (1973-1977), regional policy and development lost its significance.

The Third FYDP argued that the attempts for alleviating the differences in development across regions in a short period of time led to the irrational and unfair distribution of economic resources, and thus decreased the velocity of capital accumulation.

Shortly, in order to fasten national economic development, the problems of regional development differences were ignored. National development or decreasing regional development inequalities is the common dilemma undeveloped countries faced.

Moreover, it was declared that in the determination of the location of investments at national scale, economic criteria rather than political considerations would bear weight.

In the plan, regional development policies were replaced by Priority Regions in Development (PRD) and province based planning. It was stated that it was not possible to define regions as completely developed or underdeveloped since some underdeveloped regions had developed areas whereas some developed regions had underdeveloped ones (DPT, 2012).

Identification of natural resources on a provincial basis, in other words, defining comparative advantages of each province has been accepted. Thus development or underdevelopment was considered in provincial scale and the emphasis on regional development and planning was abandoned.

Eraydın (2001) reports that even in the official documents of the SPO the use of the term 'region' was very limited whereas several studies defined the socio – economic development level of provinces in order to determine the areas eligible for assistance.

The number of Priority Regions in Development continued to increase in this period. In 1973, number of Priority Regions in Development reached to forty, so, spatial distribution of Priority Regions in Development was no longer limited to relatively less developed Eastern and Southern Eastern Regions of the country. Again, this situation clearly shows political effects on practice. Although PRD was designed originally as a tool to promote development of underdeveloped regions at policy level, in practice in order to enjoy the privileges given to PRDs many provinces have been defined as PRD.

Regional development tools of this period were state investment, incentives aiming at private sector investments, provincial planning and inventory related studies and priority regions in development.

Table 3.2   Regional Development Principles, Policies and Tools (1973-1977)

Principles	Goals	Approach and Policies	Tools
• Removal of regional disparities • Development of some certain underdeveloped regions	• Balanced inter-regional development • Efficiency of investments • Balanced regional development for social equality	• Sectoral and provincial planning	• Financial incentives • Industrialization programs for underdeveloped regions • Inventory related studies • Provincial planning • Sectoral planning • Package projects • Development priority provinces

Source: Adopted from DPT, 2000

3.1.5   1980 - 2000: Initiation of Neo-Liberal Policies/ Emphasis on Endogenous Growth

The huge rate of inflation, lack of foreign reserves, rise in the oil price and increasing unemployment during the 1977-1980 period caused economic bottleneck. International organizations such as World Bank and IMF, to which Turkey appealed in order to overcome the obstruction in the economy by means of providing external source, lay down structural transformation as a requirement. So, a series of measures including structural changes were implemented in 1980s.

Import substitution model, which dominated the economic policies since 1960s, has been abandoned in favor of export oriented growth. In fact, 1980s became the turning point of economic policies in Turkey from protectionist attitudes dominated Turkish economic policy prior to this period (Kazgan, 1985, Boratav, 1988) to increasing reliance on market forces.

With the transformations in 1980s, opening up the economy, development of the market mechanism, limiting the public sector, controlling inflation and encouraging foreign investment were intended.

Neo-liberal policies as a consequence of radical transformations that were affected all aspects of Turkish progress also had an impressive impact on regional policy and regional and local development.

The liberalization of trade in 1984, followed by the elimination of foreign exchange controls and quotas on imports, and the revision of tariffs, increased competition between firms, and therefore, also among regions (Göymen, 2008).

Elmas (2004) asserts that reduction of state investments and decreasing importance of planning and development along with the post-1980 period increased regional inequalities. Besides, Özgen (2008) argues that export-led development strategies, state resources transferred to the private sector has been a barrier to addressing the regional development problems until 1985.

Fewer restrictions on the flow of goods provided for a rise in exports, but also increased the amount of imports, which brought negative impacts on the balance of payments (Çiçek and Eraydın, 2012). As a result, the distortion in the balance of public finance and the wrong policies to deal with increasing interest rates caused the crisis of 1994. After the crisis several fiscal rearrangements and social and political regulations to overcome the crisis and comply with the rules of EU and other international institutions were introduced in Turkey.

Economic problems and decline in income per capita led to important degradation in less developed regions, especially in Black Sea Coast and Eastern Anatolia, and brought the regional discrepancies back into the agenda.

Under the new economic relations, although incentives for private sector were characterized as main tool of regional policy, Fourth FYDP (1979 – 1983), Fifth FYDP (1985 – 1989), Sixth FYDP (1990 – 1994) and Seventh FYDP (1995-2000) put emphases on regional planning, administrative structure to prepare and implement regional plans and implementation of PRD.

In the 1980-2000 period, it was stated in the FYDPs that, uneven development among regions, the different potentials and problems of regions comprehensive made regional planning a necessity.

In this context, regional development projects especially Southeastern Anatolia Project which was energy and irrigation project became the core of attention. In this period, Southeastern Anatolia Project (GAP) was transformed from a project of irrigation and energy into a multi-sectoral regional development project. So, GAP could be accepted as the first multi sectoral and integrated regional development project of Turkey aims to satisfy overall socio-economic development.

In this period, several regional development projects for less-developed regions of the country, especially for heavily degraded regions due to 1994 crisis were prepared: Zonguldak-Karabük-Bartın, East Anatolia, and Eastern Black Sea Regions.

In addition to these regional development projects, the preliminary studies of East Marmara Regional Development Plan and the West Mediterranean Regional Development Projects were introduced in this period. In addition to regional plan studies, Action Plans were established at regional and sub-regional basis for the provinces in the less developed regions and also Immediate Support Programmes were implemented to meet the urgent

needs of these provinces (Ergin, 2002). As well as rural development projects gained an impetus within this plan period.

In this period, the regional plans were prepared for Eastern Black Sea and Eastern Anatolia Regions. Although, these regions have relatively few resources, the plans aimed to mobilize the regional potentials, like natural or human resources by public investment, external interventions. Therefore, although there has been increasing awareness that public resources were limited, the plans followed the traditional approach and gave a strong emphasis on public investment programs.

The most significant development in the regional policy in this period that was the increasing emphasis on local economic development and also local governments and local conditions. So for the development of industry, the importance of local entrepreneurs was stressed.

State support and supporting private sector for settlement centers in underdeveloped regions were also emphasized in the 1980-2000 period. Incentive schemes were revised in order to provide them with special assistance; they had limited success due to low local capital accumulation (Eraydın, 2001).

Priority Regions in Development was classified in 1981 as 1st Degree and 2nd Degree. However, the number of PRDs was also decreased sharply. In 1981 total number of provinces defined as PRD decreased to twenty-seven, ten of these twenty-seven provinces, mostly from the eastern region of the country were defined as 1st degree and seventeen provinces were defined as second degree. Besides, the incentives for PRD were enhanced with the reestablishment of the fund to support them.

Table 3.3   Regional Development Principles, Policies and Tools (1980-2000)

Principles	Goals	Approach and Policies	Tools
• The mobilization of resources for regional problems • Boosting the development at underdeveloped regions that have sectoral potentials	• The development of underdeveloped provinces • Inter-dependence of sectors and regions • Spatial organization • Balanced regional development that takes social equality into consideration • The support of districts in order to hinder migration from villages to towns	• Consolidation of inter-sectoral and inter-regional ties • Regional and sub-regional planning, • Programs and projects	• Investments at provincial and regional levels • Preparation of regional development programs for the determination of potential resources • The enhancement of the infrastructure of priority regions and sectors for the industrialization projects • Financial assistance for the investments in priority regions in development

Source: Adopted from DPT, 2000

All these policies favored developed areas such as İstanbul, İzmir that had large manufacturing capacities, rather than less - developed ones with limited capacity, which encountered many difficulties in adapting themselves to the newly emerging global trade relations (GAP İdaresi, 2002).

Nonetheless, some relatively less-developed areas (Eskişehir, Denizli, Çorum, Kayseri, Gaziantep, and Kahramanmaraş) experienced a rapid increase in their manufacturing activities by expanding their export capacities and started to be called as industrial nodes. The significance of these new nodes for industrial growth lay in that they could draw attention to the growth potential of some areas outside major manufacturing centers in Turkey. According to Eraydın (2001), the change in the production organization towards flexible specialization was, in fact, a necessity to cope with the conditions imposed by global economic linkages where small and medium – sized enterprises were prevalent.

To sum up, in this period origin of regional development was defined as endogenous supported by state interventions and regional development tools were designed accordingly. Regional development tools of this period were state investment, incentives aiming at private sector investments, regional and sub-regional plans, provincial planning and inventory related studies and priority regions in development.

3.1.6   After 2000: Europeanization and Localization

After globalization increased the importance of phenomena such as adaptation to changing conditions, competition, development of human resources, dynamic surveillance of global market, flexibility in organization structures and control of cost, therefore the importance of local dynamics has increased in economic and regional development process. This process introduced urban and local economies in global economy as an actor.

In this context, regions having local entrepreneurship capacity, utilizing local sources, accumulating knowledge and skills and other local potential defined to have comparative advantages. Also, International institutions enforced the decentralization of public administration in this period.

In 1999, Turkey gained candidate status for the European Union in the Helsinki Summit and internal political developments have led to step up efforts for integration with the European Union (Filiztekin, 2008). European Union attaches great importance to reduction of regional disparities and harmony; one-third of the Union's budget is allocated to structural funds on this issues. In 2005, accession negotiations with the EU have been formally opened. Similar to the other candidate countries, in the process of accession, Turkey is in a position to align its policy with the acquis commuautaire. Among other topics, regional policy and regional state aid policy (within competition policy) were the two policy areas that policy and legislation needs to be harmonized with the EU. In this context, emphasis on regional differences and development increased in Turkey (Filiztekin, 2008).

Besides, 2001 crisis that Turkey experienced meant the bankruptcy of economic policies implemented in the previous period, and pointed out the need of significant policy change. Therefore, after 2001 significant changes occurred in regional policy which was developed in cohesion with EU regional policies.

It is clearly stated in the Eighth FYDP (2001-2005) and Ninth Development Plan (2007–2013) that Turkish regional policies are developed in cohesion with EU regional policies.

The relationship between the national objectives and regional development was clearly emphasized in the eighth FYDP. Regional plans establish vertical and horizontal relations between socio-economic plans on country level and detailed physical plans on local level and the determination of the work to be conducted regarding public and private sector in order to activate local and regional resources.

Regional planning studies were accelerated and continue during Eight FYDP period. The plan includes implementation, revision and updating decisions for existing regional development projects (South-eastern Anatolia Regional Development Project, Eastern Anatolia Regional Development Project, Eastern Black Sea Regional Development Project,

Eastern Mediterranean Regional Development Plan and Marmara Region Plan) and preparation of a new regional development plan (Yeşilırmak Basin Development Project).

Main objective of investment incentive policies of the plan was to support investments and activities that ensure integration with the world, transform into the information society and encourage foreign investment, besides Investments integrated to other projects and projects contributing to regional development.

An important aspect of the accession process of Turkey to the EU is the pre-accession financial assistance. Turkey can receive from the EU as a candidate country in line with the Accession Partnership (Official Journal of the European Communities, 2001d). For the implementation of the pre-accession financial assistance, Preliminary National Development Plan (PNDP) covering 2004-2006 period was prepared. The Preliminary National Development Plan designated twelve NUTS 2 level regions in Turkey to which a certain part of the pre-accession financial assistance will be directed for the purposes of supporting regional development to contribute to the reduction of regional disparities. Medium-term Strategy was defined in the PNDP in line with the long term strategy. The Medium-term Strategy consists of five basic objectives.

One of the development axes of the PNDP strategy for economic and social cohesion with the EU was defined as reducing the developmental differences among the regions, ensuring rural development, and reducing the social imbalances due to poverty and income inequality (DPT, 2003).

The main approach in regional policies of the PNDP was to reduce the developmental differences among the regions. Especially in the less developed regions, measures shall be taken to stimulate local potential, and emphasis shall be put on capacity building, particularly in respect of project making.

Similar to long term strategy, PNDP emphasizes principles of sustainability, interregional integration, quality of life, social and economic balance, cultural development and participation.

In this period, Ninth Development Plan (2007-2013) was prepared according to strategic planning approach with the vision of "Turkey, a country of information society, growing in stability, sharing more equitably, globally competitive and fully completed her coherence with the European Union".

To sustain economic growth and social development in a stable structure during the Ninth Development Plan period and to realize the vision of the Plan, five strategic objectives have been determined as development axes. Sectoral and thematic policies and priorities have been considered under these axes and are made interrelated in a way to serve the same strategic objective.

One of five strategic objectives is defined as "Ensuring Regional Development". Under this strategic objective four priorities are defined:

- Making regional development policy effective at the central level,

- Ensuring Development Based on Local Dynamics and Internal Potential,

- Increasing Institutional Capacity at the Local Level,

- Ensuring Development in the Rural Areas.

Regional development policies under "Ensuring Regional Development" strategic objective were defined in the same context of the previous plans. According to the plan regional development policies would contribute to national development, competitiveness and employment by increasing productivity of regions on the one hand and they would serve the basic objective of reducing regional and rural-urban disparities on the other hand.

In this context; emphasis were placed on activities towards increasing the consistency and effectiveness of policies at the central level, creating a development environment based on local dynamics and internal potential, increasing institutional capacity at the local level and accelerating rural development.

Eraydın summarizes this progress as:

> "New laws were adopted to create new mechanisms to transfer major spending powers to special provincial administrations, metropolitan municipalities and other municipalities. Secondly, the new regulations redefined the new roles for metropolitan governments in the provision of services. The new roles assigned to local governments covered education, health and protection of cultural and natural resources, which meant an increased role for the metropolitan municipalities against central government institutions. Third, the new legislation that was adopted in 2005 increased the resources of local governments. Lastly, the regional development agencies are defined as a part of decentralization of administrative mechanism, although still the dominance of central government is important in decision mechanisms of the agencies established at NUTS 2 level".

The Law No. 5449 on the Establishment, Coordination and Duties of the Development Agencies (Resmî Gazete, 2006a) was enacted in 2006. Two development agencies (İzmir and Çukurova -Adana and Mersin- Development Agencies) and in 2006, eight development agencies in 2008 were established. With the establishment of development agencies for remaining sixteen NUTS 2 regions in 2009, development agencies were established for all NUTS 2 regions. In addition to these progresses, Ministry of Development was established in 2011.

Table 3.4   Regional Development Principles, Policies and Tools (After 2000)

Principles	Goals	Approach and Policies	Tools
• Integration of sectoral and special studies • Sectoral specialization of provinces • Enhancement of competitiveness • Sustainable development • The activation of • Sustainability • Sourcing of attendant plans • Harmonization with EU regional policies	• Rationalization of migration and demographic development • Handling of the problems of Metropolitan regions as a separate category • Policy development efforts against housing problem • Regional disparities • Enhancement of competitiveness • The mobilization of local entrepreneurship and local resources	• Regional and sub-regional projects • The mobilization of regional capabilities • Strategic regional planning • Clustering • Provincial development plans	• Prolongation of development priority policies • Immediate support program for Eastern and West eastern Anatolia • Legal regulations and decentralization • Support for SMEs located in Priority Regions in Development • ZBK, YHGP, DOKAP, DAP • SME support • EU funds • Development agencies

Source: Adopted from DPT, 2000

3.1.7 Evaluation: Evolution of Regional Policies in Turkey

Regional policies have shaped up by recognition of regional problems, regional development paradigms and economic conjuncture in all over the world. There have been efforts to create new policy tools and institutions parallel to changes in regional policies.

It can be observed from the policy documents of that Turkey has closely followed changes in regional paradigms and policies in the world, but implementation of these developments into Turkey's regional policy arena has not realized. For example except the third one, the necessity of regional planning was stressed in every FYDP, but number of regional plans is very limited.

Although Turkey had much experience that could be a model to so many countries in the 1960s, not renewing perspective, not developing institutions in this regard brought very poor regional planning and regional development policies in the 2000s in Turkey (Eraydın, 2004)

Turkey faced a common dilemma that undeveloped countries faced: national development or decreasing regional development inequalities. So, in order to fasten national economic development, the problems of regional development differences were ignored.

Due to regional problems in Turkey, recognition of regional development problems and inequalities has been somehow different. This recognition led to problems in policy development and implementation.

1980s became the turning point of economic policies in Turkey from protectionist attitudes to increasing reliance on market forces. This date is also turning point for Turkish regional policy. Before 1980, state was the only actor and direct public investments were the main policy tool. After 1980, direct public investments lost significance and local dynamics and investments, regulations that support local dynamics has gained importance.

The shift from state led development to neo-liberal economic policies at the national level caused a change in classical regional policies to export promotion assistance to regions. The new policy helped the regions with certain capacities and competence and motivated them to use all their accumulated competence in order to gain competitive advantage in international markets, but did not contribute the ones with limited capacities. The policies in the recent decade, although aware of the new conditions defined by the knowledge economy, it is difficult to say that the efforts to develop the innovative basis of the regions are substantial. Most of the regions do not have the capacity to be integrated to the knowledge economy.

The new Republic just focused on overall development and restructuring (Kepenek and Yentürk, 2001; Keles, 2006, Elmas and Demirel, 2010) to create a national economy by means of redistribution of public services and industrial investments. The deconcentration of population and large scale industries and dispersion to different regions of the country can be seen as the main strategy in terms of regional policy. Although the state tried to disperse public investments to different regions of the country, especially to Eastern regions since they were more depressed, this could only be partially realized (DPT, 2000).

Public investments were directed to small cities in Anatolia but private sector investments whose priority was maximizing profit rather than reducing regional disparities were concentrated in İstanbul and Marmara region (Kuruç, 1999).

Low effectual and unsustainable public investments in the different regions of the country, especially to the eastern regions and investment pattern of private sector caused the emergence of serious regional disparities in this period.

In 1960-1970 period, the regional policies and plans were in compliance with the import-substitution policies of the period, which formed the basis of industrialization process of

Turkey until the 1980s. Similar to former period, state was the main actor and state-led regional policies were developed in this context.

Although there was no change in the economic policy in Turkey, 1970s denoted important changes for Turkey in terms of regional policies. Firstly, the emphasis on public sector investments was faded in favor of private entrepreneurship. The regional development is seen as "a cooperative effort of defining natural resources of regions and supporting the most advantageous fields of activity in these areas". But, regional planning lost its significance; instead, incentive schemes were defined as the major tool for reaching the regional objective of convergence (Çiçek and Eraydın, 2012).

The liberalization of trade in 1984, followed by the elimination of foreign exchange controls and quotas on imports, and the revision of tariffs, increased competition between firms, and therefore, also among regions (Göymen, 2008).

The most significant development in the regional policy in this period that was the increasing emphasis on local economic development and also local governments and local conditions. So for the development of industry, the importance of local entrepreneurs was stressed.

All these policies favored developed areas such as Istanbul, Izmir that had large manufacturing capacities, rather than less - developed ones with limited capacity, which encountered many difficulties in adapting themselves to the newly emerging global trade relations (Gap İdaresi, 2002).

Nonetheless, some relatively less-developed areas (Eskişehir, Denizli, Çorum, Kayseri, Gaziantep, and Kahramanmaraş) experienced a rapid increase in their manufacturing activities by expanding their export capacities and started to be called as 'industrial nodes'. The significance of these new nodes for industrial growth lay in that they could draw attention to the growth potential of some areas outside major manufacturing centers in Turkey. According to Eraydın (2001), the change in the production organization towards flexible specialization was, in fact, a necessity to cope with the conditions imposed by global economic linkages where small and medium – sized enterprises were prevalent.

3.2 Regional Policy Tools

Regional development approach/ discourse in Turkey's planned development practice has changed parallel to the changes in the socio-economic structure in the world, but development and implementation of policy instruments appropriate to discourses is very conservative.

Evolution of policy tools has failed to lead to significant progress in Turkey. There is no significant difference between policy tools of the traditional regional development theories, which focused on industrialization efforts via large-scale enterprises and transfer of central government funds to disadvantaged regions and regional development approach based upon endogenous capabilities and potential of innovation and knowledge creation. Only evolution is changing emphasizes on some policy tools over time. Main policy tools employed in Turkey are

- Regional plans and projects,

- State aid and incentives,

- Public investments,

- Regional development programmes.

In the fallowing section these policy tools are reviewed.

3.2.1   Regional Development Plans and Projects

Regional development plans have been seen as major regional development tool to solve inter regional economic and social disparity since the start of planned period. Political desire for making regional plans to solve resolve the problem was quite alive especially in 1960s. While objectives of regional plans, at the early period, are defined as:

- To reduce the development differences of the regions according to the framework of the aim and objectives of national development plans,

- To increase the welfare levels of the people living in the less developed regions,

- To achieve a balanced migration structure in the metropolitan areas.

Later some objectives have been added to these objectives

- to achieve a diversified structure of economic activities,

- to support local entrepreneurs to accelerate the local potentials and

- to have an efficient usage of local resources

In this context, several regional development plans and projects have been prepared. The first experience of Turkey's regional development plan which is East Anatolian Development Plan (1935-1936) goes back to the pre-planned period. But regional planning had not been employed for a long time. Köyceğiz- Dalaman Project initiated by OECD in 1957 can be designated as start of development of regional planning approach in Turkey (Tekeli, 2008).

As mentioned above, the regional planning efforts had been made by Ministry of Public Works and Settlements (MPWS) before establishment of SPO. Regional planning has substantially altered with the establishment of SPO in 1960. The tasks of making necessary research in the region and of preparing long- and short-term plan and programs were assigned to the institution as per decree on establishment and duties of SPO.

After establishment of SPO, SPO prepared Antalya Project (1959-1965), Keban Project (1864-1968) and Çukurova Project (together with MPWS, 1962-1963). On the other hand, Eastern Marmara Plan (1960-1964) trying to guide the growth of industry in Istanbul, Zonguldak Plan (1964-1968) aiming to eliminate the imbalances in iron, steel and coal development in the center of Zonguldak were prepared by MPWS. It is very significant to note that after these planning studies which were prepared during First FYDP period, no new planning study was started. After a long time, South Eastern Anatolian project started at the end of 1980s.

Zonguldak-Bartın-Karabük Regional Development Project was completed during Seventh FYDP period. After this period, the Eastern Black sea Regional Development Plan (DOKAP), The Eastern Anatolia Project (DAP) and Yeşilırmak Basin Development Project (YHGP) were prepared.

Although, the law on establishment, coordination and duties of Development agencies is not mentioned preparation of regional development plan among the duties of development agencies, after the establishment of Development Agencies pre-regional development plans or regional development plans have been prepared for all NUTS 2 regions by related development agency.

Analyzing the regional development plans shows that there are two approaches effective in regional development planning. The first group was prepared according to comprehensive planning approach and emphasized traditional development factors. These plans were designed according to traditional policy tools: i.e. public investments, incentives. The plans prepared until Yeşilırmak Basin Development Project (YHGP) can be put into this group. A

new planning approach entered into planning practice with YHGP. Strategic planning approach employed in the YHGP. Besides, significance of local potentials and supporting them by incentives and investments are emphasized. After YHGP, pre-regional development plans and regional development plans are prepared by mainly development agencies and employed strategic planning approach. These plans also emphasized local potentials for development.

The main shortcoming of this planning approach was that being sector-based. The main goal of this development oriented planning is to promote investments in certain sectors without any emphasis on the geographical distribution of related sectors. In this context, GAP, once more, is an exception as it is multi-sectoral and somehow decentralized (Loewendahl-Ertugal, 2005).

Regional development plans aiming to reduce regional imbalances and promote the development, except GAP, were not effectively implemented. Mutlu (2009) lists the reasons under the unsuccessful regional development plans in Turkey as:

- The idea that regional plans would lead to discrimination was effectual among the senior bureaucracy in the 1960s,

- A wide audience in decision making argue that the country's first target is the maximum rate of growth, and regional plans would have a negative impact on the realization of this objective,

- Necessary resources for the implementation of regional plans are not allocated due to budget deficit,

- A participatory approach to regional plans had not been realized, as a result, plans are not owned by a wide audience,

- There was no political support for regional plans, except 1980s and early 1990s,

- Implementation of regional plans is not suitable in the national plan morphology in which the allocation of resources are made according to sectoral priorities, regional concerns are often secondary cases,

- Regional planning does not have unique implementation tool.

3.2.2   Public Investments

In Turkey, public investment, particularly public infrastructure and social investment, is recognized as the most important determinant of capital accumulation, therefore development. Public investment structure of Turkey is project based. SPO evaluates and decides for public investments. SPO evaluates the projects proposed by public institutions, by considering plan targets, public investment policy, national economy and sectoral and cross-sectoral priorities to allocate resources to the projects. Public investments by NUTS 3 regions are reviewed in Chapter Five.

3.2.3   State Aid and Incentives

Supporting development with central government assistance is a significant policy tool since 1913 when the legal framework on assistance to industry was enacted (DPT, 1995a).

Currently, the Law (no 5084, dated 2004) on the Encouragement of Investments and Employment and on the Amendment of Certain Laws (Resmi Gazete, 2004) together with

the Decree on State Aids to Investments (no 3305, dated 2012) (Resmi Gazete, 2012) form the legal basis of state aid in Turkey.

The law on the Encouragement of Investments and Employment and on the Amendment of Certain Laws (Resmi Gazete, 2004) defined four types of regional state aid measures. These are:

- Income tax relief,

- Compensation for the employers' share of the social security premium,

- Allocation of land for investment for free, and,

- Energy support.

These measures are designed for provinces whose 2001 GDP per capita is lower than 1500 USD (36 provinces). This law was amended by the law on amendment of Encouragement of Investments and Employment and on Certain Laws (no 5350, dated 2005). With this law, in 2005, provinces whose 2003 socio-economic development indicator is negative (13 provinces) were added to these provinces. However, in terms of allocation of free land for investment, other provinces grouped under Priority Regions in Development whose GDP per capita is higher than 1 500 USD and whose economic development indicator is positive can also benefit from this specific incentive (17 provinces). Therefore, 66 out of 81 provinces of Turkey are eligible for regional state aid.

According to the Decree on State Aids to Investment (2012/3305) which was issued in 2012 for the purposes of granting state aid, provinces were grouped according to their 2011 socio-economic development level. In this scope, six groups are designed (Figure 3.1).

The decree regulates the principles and procedures for incentives to

- redirect savings to high value added investments,

- increase production and employment,

- promote regional and large-scale investments with high content of research and development that will increase the international competitiveness and to promote strategic investments,

- increase foreign direct investments,

- reduce regional disparities,

- support investments on clustering and environmental protection and research and development activities

Figure 3.1   Socio Economic Development Groups Defined by the Decree on State Aids to Investments (2012/3305) based on 2011 Socio Economic Development Level

For this purpose, the decree changed incentive schema that Turkey implementing for a long time. The decree developed incentive system as general incentives, regional incentives, incentives for big scale investments, and incentives for strategic investments. State aids for these four groups are summarized in Figure 3.3.
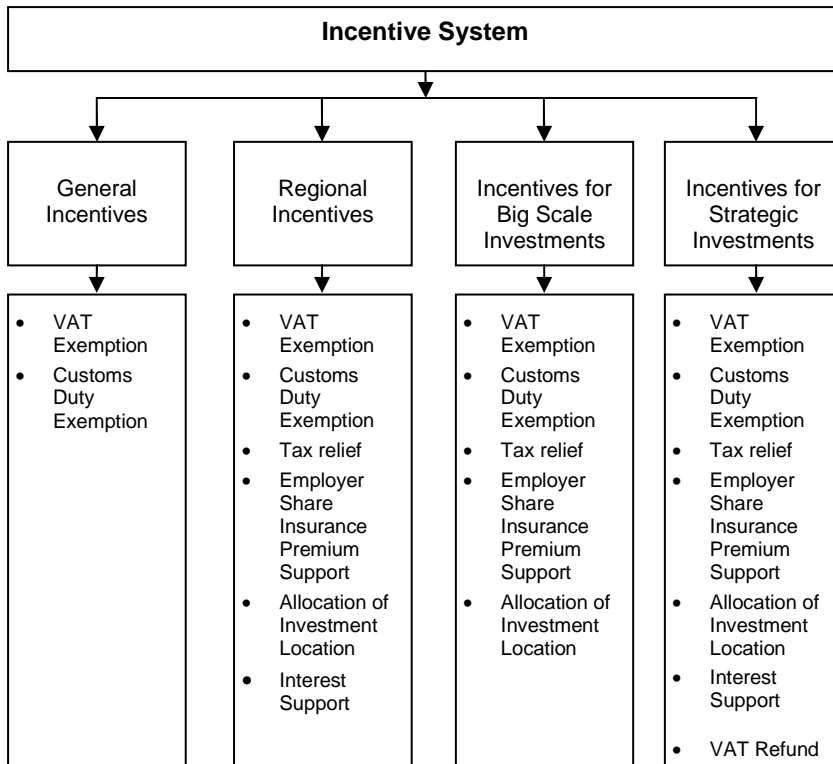
Figure 3.2   State Aids to Investments (2012/3305)

The regional breakdown of investments with investment certificates can be taken as an indicator to assess the weight of regional state aid in Turkey. The regional data on investment incentives basically provide information on state aid in three main categories: total number of incentive certificates, total amount of investment, and total number of people employed. Regional data on incentives is analyzed in Chapter Five.

Priority Regions in Development

The concept of priority regions in development has been employed to geographical distribution of incentives. The concept was entered the Turkish regional planning practice, as mentioned above, during the period of the Second Five-Year Development Plan (1968-1972). The idea behind the designation of less-developed provinces as priority regions in development was improve investment conditions and increase attractiveness by offering various investment incentives such as tax discounts and preferential interest rates.

Although it is argued that several indicators used for objective determination, increase in the number of provinces designated as priority regions in development since 1968 can be explicated as political impress on decisions. Changes in the geographical scope of PRD are illustrated in Figure 3.3 and 3.4.

This enlargement, on the other hand, has restrained the efficient utilization of public resources (Dağ, 1995). Furthermore the political process for the choice of priority regions in development has caused a priority regions in development scope that is not scientific (Gezici and Hewings, 2001).

Figure 3.3   Priority Regions in Development as of 1968

Source: DPT, 2000.

Figure 3.4   Priority Regions in Development as of 1972

Source: DPT, 2000.

Other than the public investments which are carried out by the government, the national policy to support development in the Priority Regions in Development has been carried out through the provision of a number of investment incentives to the private sector in these areas (Uğurlu, 2006).

In the framework of Priority Regions in Development, incentives for private sector, applications to improve wage levels of labor force relatively, credit supports for agricultural and vocational purpose, financial supports to investments from the Public Partnership Fund, financial supports from the SPO budget to the projects of local administrations in PRD have been provided (DPT, 2007)

Development Agencies

Development agency which is designed as facilitator institution supply technical and financial support to local capacity. In the Law on the Establishment, Coordination and Tasks of Development Agencies (no 5449, dated 2006) objectives of establishment of Development Agencies (DA) are defined as improving collaboration between public sector, private sector and voluntary sector, providing effective use of resources and accelerating the regional growth by being in line with proposes of national development plans and programs, activating local potential, ensuring sustainability and reducing inter-regional and intra-regional disparities.

A significant amount of financial resources from general budget, local authorities (municipalities and special provincial administrations) and chambers of commerce and industry are allocated to the DAs for the sake of stimulating local/ regional potentials (DPT, 2007).

In addition to DAs, regional development administrations (RDAs) of the Southeastern Anatolia, Eastern Anatolia, Eastern Black Sea and the Konya Plain Project have been appointed in order to locally coordinate and to expedite the development of regions covered by these projects by fulfilling researches as required by investments, planning, programming, project design, monitoring, and evaluation and coordination services. These administrations are Southeastern Anatolia Project Regional Development Administration which was

established in 1989, East Anatolia Project Regional Development Administration, Eastern Black Sea Project Regional Development Administration and the Konya Plain Project Regional Development Administration that were established in 2011.

3.2.4 Regional Development Programmes

EU Supported Regional Development Programmes

EU supported regional development programmes were initiated in twelve priority regions at NUTS 2 level defined by Preliminary National Development Plan covering 2004-2006 period. Implementation of regional development programs at NUTS 2 level which have strategic nature and independent budget are foreseen in National Development Plan (Kayasü and Yaşar, 2006).

Regions where EU supported regional development programmes and cross-border cooperation programs implemented are given in Figure 3.5.

Grant support for regional development programmes which were implemented in the framework of Turkey-EU Pre-Accession Financial Cooperation is provided for development in human resources, increase in employment, construction of small scale infrastructure and rural infrastructure and supporting entrepreneurship

In order to implement the EU supported regional development programmes effectively, management structures were constituted at the centre and programme regions (SPO, 2007)

EU Supported Regional Development Programmes were implemented under four headings:

- Eastern Anatolia Development Programme (EADP),

- Regional Development Programme in TR 82, TR 83 and TR A1 NUTS 2 Regions,

- Regional Development Programme in TRA2, TR72, TR52 AND TRB1 NUTS 2 Regions and

- Regional Development Progamme in TR90 NUTS 2 Region

Eastern Anatolia Development Programme (EADP) covers TRB2 NUTS 2 region (composed of Bitlis, Hakkari, Muş and Van provinces) and aims to support sustainable socio-economic development and reduce regional disparities through capacity building by the implementation of regional development projects in the region. Programme components are agriculture and rural development, SMEs, tourism and environment and social development.

Objective of the regional development programme in TR 82 (Çankırı, Kastamonu and Sinop), TR 83 (Amasya, Çorum, Samsun and Tokat) and TR A1 (Bayburt, Erzincan and Erzurum) NUTS 2 regions is to realize socio-economic development with the implementation of projects in the priority areas of local development initiatives, SMEs and small scale infrastructure (SPO, 2007). Programme components are local development initiatives, SMEs and small scale infrastructure (SPO, 2007).

TRA2 (Ardahan, Kars, Ağrı and Iğdır), TR72 (Yozgat, Kayseri and Sivas), TR52 (Karaman and Konya) and TRB1 (Tunceli, Bingöl, Elazığ and Malatya) NUTS 2 Regions Development Programme covers 13 provinces.

Objective of the programme is to contribute to the economic development of the four priority regions targeted by Preliminary National Development Plan for support under economic and social cohesion measures and to improve the project preparation and implementing capacity

at the central and regional level (SPO, 2007). Programme components are agriculture/ livestock, local development initiatives and small scale infrastructure.
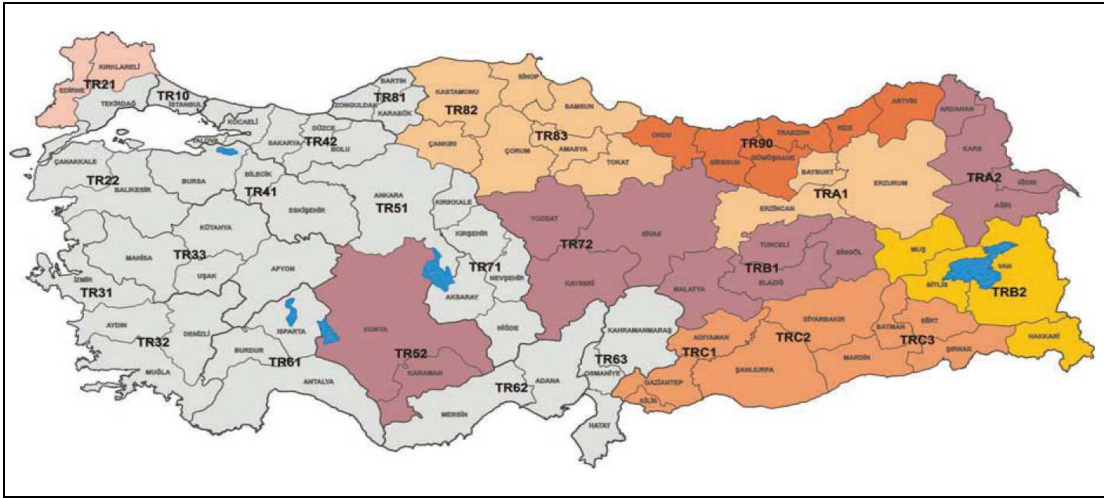
Figure 3.5   NUTS 2 Regions Where EU Supported Regional Development Programmes and Cross-Border Cooperation Programs Implemented

Regional development prorgamme in TR90 (Artvin, Giresun, Gümüşhane, Ordu, Rize and Trabzon) NUTS 2 region aims to support the objective set out in Preliminary National Development Plan of reducing interregional disparities in Turkey and build institutional capacity at both central and regional level (SPO, 2007).Programme components are tourism and environment related infrastructure, SMEs and local development initiatives

In addition to EU supported regional development programmes Turkey-Bulgaria Cross-Border Cooperation Programme for the period of 2004-2006 is implemented to support the local cooperation between all the Turkish provinces and Bulgarian districts along the border; namely Edirne and Kırklareli provinces on the Turkish side, and Haskovo, Yambol and Burgas on the Bulgarian side.

Objectives of the programme were to support the balanced and sustainable local/regional development of the border region between Turkey and Bulgaria, and to establish and develop of cooperative networks on both sides of the border and the creation of linkages between these networks and wider European Union networks (SPO, 2007).

Growth Centres (Poles)

The one of the newest regional development tools is growth centres (poles) program. The program is based on growth pole theory. The program is based on the two axes of Ninth Development Plan; "ensuring regional development" and "improving competitiveness".

The aim of the two axis of Ninth Development Plan; "ensuring regional development" and "improving competitiveness" is to create development atmosphere based on regional dynamics and internal potential by selecting growth centres which have high potential to grow and serve to its neighborhood especially in underdeveloped regions and setting spatial priority and focus for public sector investments and service supply in those growth centres (DPT, 2007).

This program aims to capture the momentum of development by key interventions in urban centers located in the less developed regions with a relatively high potential and eventually aims to held internal migration in their regions by spread this momentum to nearby centers (DPT, 2012)

For this purpose, Diyarbakir, Elazığ, Erzurum, Gaziantep, Kayseri, Konya, Malatya, Samsun, Sivas, Şanlıurfa, Trabzon, and Van, provinces are selected as growth centres. The studies regarding the specific policies and implementation for these centres are continuing.

3.3   Evaluation

Turkey has closely followed changes in regional paradigms and policies in the world, but implementation of these developments into Turkey's regional policy arena has not realized. Although the removal of regional disparities has been the main regional policy goal, the understanding of regional and sub-regional development in Turkey has not proceeded on a comprehensive and consistent path.

1980s became the turning point for Turkish regional policy. Before 1980, state was the only actor and direct public investments were the main policy tool. After 1980, direct public investments lost significance and local dynamics and investments, regulations that support local dynamics has gained importance.

Figure 3.6 summarizes changes in regional policies, policy tools and implementation in Turkey.

Figure 3.6 Changes in Regional Policies, Policy Tools and Implementation in Turkey

Structural Change
- Establishment of Directorate of Regional Planning under Ministry of Public Works
- Establishment of Ministry of Public Works and Settlement (MPWS)
- Establishment of SPO, Social Planning Department Regional Planning Group
- Establishment of PRD Department under SPO
- Establishment of South Eastern Anatolia Project
- Establishment of 2 DAs (Izmir and Çukurova - Adana and Mersin) at NUTS 2 regions
- Establishment of 8 DAs at NUTS 2 regions
- Establishment of 16 DAs at NUTS 2 regions
- Establishment of Ministry of Development and Higher Regional Development Council
- Establishment of Konya Plain Project RDA, East Anatolia Project RDA and East Black Sea RDA
- Establishment of Development Research Center under Ministry of Development

Date: 1957, 1958, 1960, 1971, 1989, 2006, 2008, 2009, 2011, 2012

Main Policy Tools
- Determination of PRD
- Separation of PRD into two groups
- Law on encouragement of investments and employment
- Implementation of Turkey- EU Co-Financed Regional Development Programs at 12 NUTS 2 Regions
- Definition of 12 Attraction Centers by Higher Planning Council
- Commencement of implementation of Growth Centers Pilot Project at Diyarbakır
- Decree on state aids to investments

Regional Plans
- Köyceğiz-Dalaman Project by OECD
- SPO Initiated Projects: Antalya Project, Keban Project, Çukurova Project (with Ministry of Public Works and Settlement)
- MPWS Initiated Projects: East Marmara Plan, Zonguldak Project
- Initiation of South Eastern Project by SPO
- New Regional Plans by SPO: Zonguldak Bartın Karabük RDP, East Black Sea RDP, East Anatolia RDP, Yeşilırmak RDP, Revision of South Eastern Anatolian Plan
- Izmir Regional Plan By DA
- Preparation of Pre Regional Development Plans at 3 NUTS 2 regions by development agencies
- Preparation of (Pre-) Regional Development Plans at 25 NUTS 2 regions by development agencies

General Characteristics of Regional Policy
- Dissemination of direct public projects throughout the country
- Regional plans for efficient use of resources
- Different incentives for different regions; Incentives for export; Supporting endogenous potentials
- Regional plans for development; Supporting endogenous potentials; Localization (development via development agencies)

CHAPTER 4

METHODOLOGY AND DESIGN OF THE STUDY: FACTORS OF DEVELOPMENT

In Chapter Two, theoretical frameworks on economic and regional growth and empirical analysis interested in these theories have been discussed. Over the last few decades, economic growth and regional growth discourses have altered significantly. Regional growth theories have shifted from the traditional regional development theories which focused on industrialization efforts via large-scale enterprises and transfer of central government funds to disadvantaged regions, to regional development based upon endogenous capabilities and potential of innovation and knowledge creation.

The growth discourses and theories have changed substantially, parallel to changes in the economic regime in world. Early economic growth theories established primary and fundamental growth factors that affect amount of production and consumption of the produced products. Changes on the production mode, assumptions on functioning of market, role of state, firms and individuals brought new growth factors. Flexible production instead of mass production, quality based competition rather than quantity based, firms and individuals aiming to increase total profit rather individual profit are the characteristics of new theories. Therefore, economic growth factors evolved from quantitatively measured hard factors to qualitatively measured soft factors.

Regional development theories experienced similar shift. The shift is mainly from the traditional growth theories to regional growth based upon endogenous capabilities and potential of innovation necessitating knowledge creation

Although, recent contributions imply that there is consensus on factors of regional development, neither success of theories nor success of proposed factors is comprehensively discussed yet.

This consensus is a result of incomprehensive empirical studies on successful regions or districts. Besides, the real world situations that have been analyzed empirically have focused on regions in economically advanced and technologically innovative economies. Comparable studies of less developed countries and their regions that suffer from poverty, unemployment and regional disparities are far fewer (Jordaan, 2008a, 2008b). There is significant number of studies criticizing recent empirical analyses for:

- selecting case studies support the theories (Staber, 1996),

- neglecting or relegating fundamentals of capitalist economies (Hudon, 1999),

- playing up transitory or even illusory characteristics like trust and reciprocity (Pratt, 1997),

- neglecting the role of domination, subordination, and power in business relationships (Taylor, 1999),

- being inconsistent, ambiguous and contradictory (Gertler, 1992; Sternberg, 1996 and Taylor, 1986).

After having discussed theoretical explanations and reviewing empirical studies in Chapter Two, this part of the thesis is an attempt to design an empirical study. The following sections include the aim and the context of the empirical study, the hypothesis, research design and empirical model.

4.1   The Aim and the Context of the Study

As a result of post rationalization efforts, growing emphasis occurred on the importance of endogenous potentials for regional/ local development after 1990s and recent development literature overemphasizes endogenous factors and self-development. Due to the growing emphasis, endogenous factors and self-development discourses became dominant in regional development policies and implementations. However, explanatory power of recent growth theories has not examined comprehensively. There is a gap between theories and empirical studies. So, policies and implementations in this scope are huge, but this is an unseen obstacle for undeveloped regions that do not have self-development capability.

In this context, the purpose of the thesis is defined as to contribute to empirical field at regional level by comprehensively analyzing the growth factors that are defined by theories.

The case study aims to clarify and explain the growth factors at regional level. The empirical study includes analyses of a set of growth theories (Keynesian growth, neo-classic growth, endogenous growth, linear stages, structural change, economic base theory, growth pole theory, flexible production theory, new industrial district and clustering, innovative milieu, learning regions and regional innovation system). This analysis also enables identifying and explaining the relationship between factors and growth. The study also aims to analyze explanatory power of theories for regional development pattern of Turkey.

Regional analysis, generally, is undertaken with a single-region case study as if the selected single region ideally represents all regions. This is a significant methodological weakness of such studies. Regional analysis should be deep as and broad to reach definitive results. As mentioned above, main problem of recently theorized ideas and empirical studies dedicated to recently developed theories is considering only one successful region. To overcome this problem, geographical scope of the empirical study is defined as 81 NUTS 3 regions (provinces) of Turkey (Figure 4.1).

Figure 4.1   Geographical Scope of the Study: NUTS 3 Regions (Provinces) of Turkey

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4.2   The Hypotheses of the Study

As reviewed in Chapter Two, development factors emphasized by theories evolved from exogenous to endogenous elements like; social capital, knowledge and dissemination of knowledge, learning ability and innovation. However, these issues are criticized being depending on socio-economic context (Audretsch and Felman, 1996; Sweeney, 1996; Kirat and Lung, 1999). The unanswered question constitutes the main motive of this study: "Do factors that are emphasized by endogenous regional development theories able to explain the development in all regions?" and hypothesis of the thesis is defined as:

"Factors highlighted by recent regional development theories are not sufficient for explaining growth, since the regional policies at the national level continue to be important therefore factors emphasized by traditional theories still have significant contributions to growth."

In addition to thesis's hypothesis, hypothesis of above mentioned growth theories are tested. For this purpose, research is designed in a way that enables both thesis hypothesis and reviewed theories.

As mentioned before, there is very limited number of empirical study (Plummer and Taylor, 2001a and 2001b; Ersoy and Taylor, 2011; Ersoy, 2011; Çiçek and Eraydın, 2012). While Plummer and Taylor (2001a and 2001b) discuss six institutionalist theories of local and regional economic development (the competitive advantage, learning regions, flexible specialization, product cycle, growth pole and enterprise segmentation models) and define eight growth measures for the Australian context. Ersoy (2011) added creative class theory to Plummer and Taylor's (2001a and 2001b) six institutionalist theories and rerun the model for Turkish context. On the other hand, Çiçek and Eraydın (2012) reviewed theories and analyze eighteen growth factors for Turkish context. The thesis also analyzes growth factors for Turkish context. As Turkey is in a transitional economy and developing country.

4.3   Research Design

The research is designed to address issues of empirical validation, the theory-empiricism gap, and the validity of theories in terms of regional growth. After exploring a range of theories of in Chapter Two it is aimed to build an econometric model.

Procedural steps of the research can be gathered under seven headings. These steps and influential items which shaped the steps are given in Figure 4.2.
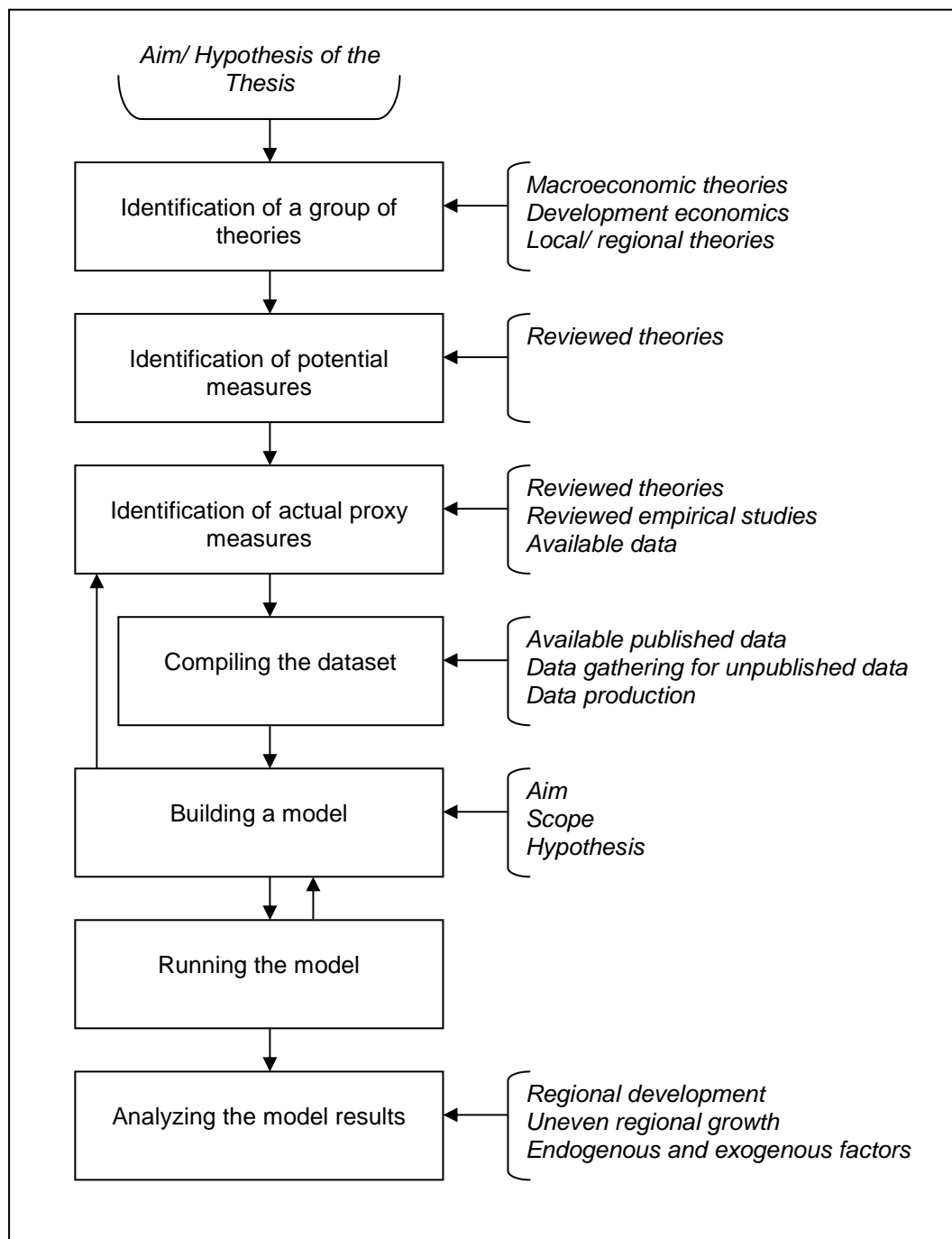
Figure 4.2   Steps of the Research Design and Influential Items

Empirical research starts with identification of a group of theories. In Chapter Two, significant number of theories is reviewed in order not to omit a growth factor, territorial growth theories, macro economies growth theories and growth theories in development economics are reviewed. The theories are classical growth theory (Smith, 1776) Keynesian theory (Keynes, 1936), neoclassical growth theory (Solow, 1957 and Swan, 1956), endogenous growth theory (Howitt, 2008; Brzezinski and Dzielinski, 2009; Segerstrom, Anant and Dinopoulos, 1990; Grossman and Helpman, 1991a; 1991b; 1991c; Aghion and Howitt, 1992; Dinopoulos, 1994).linear stages (Rostow, 1956; 1960 and Gerschenkron, 1962) structural change models

(Lewis, 1954; Chenery, 1960; Chenery and Taylor, 1968), economic base theory (Hoyt, 1954; Douglass, 1955), growth pole theory (Perroux, 1955), flexible production theory (Scott and Storper, 1992), new industrial district and clustering (Becattini, 1979; Scott, 1988; Porter, 2000), Innovative Milieu (Aydalot, 1986; Maillat, 1995; Maillat 1996; Maillat and Lecoq, 1992), learning regions (Florida, 1995) and regional innovation system (Cooke, et. al. 1997).

At the second stage theoretical knowledge and potential growth factors has been constructed by reviewing above mentioned models. After defining all factors for each theory, some general factors eliminated and factors make sense and specific to the theory are kept (factors make sense and specific to theories are given in Table 4.2).

After the identification of growth factors, possible proxy measures are defined to assess each factor. In this stage, theories, empirical studies and availability of for defined proxy are considered.

In the fourth stage, the dataset is compiled. In that stage, available published data by related authorities and unpublished data is searched besides in some cases secondary data produced or calculated from the collected data. Available all proxies are collected in line with the theories of local economic growth to understand the processes driving such growth in Turkey (available all data for the proxies are given in Table 4.2).

In the next stage, an econometric model is constructed by considering specification and data issues and the model is run in the model and finally the results of the model are analyzed.

Models are a simplified representation of an actual phenomenon, enormously complex system to understand process.

There are rich set of tools for the study of growth. General-to-specific modeling strategy is preferred among the rich set of tools. In the following sections the need for using general to specific modeling and main characteristics of general to specific modeling, specification and data issues, the choice of the development factors, proxies and data sources and empirical model are explained.

4.3.1   The General-to-Specific Approach

There are rich set of tools for the study of growth in the area of growth econometrics. Although many have questioned the adequacy of quantitative methods, it has been argued that quantification can potentially make a significant contribution to understanding regional economic growth (McLafferty 1995; Moss 1995; Plummer and Sheppard 2001; Sheppard 2001; Kwan 2004).

Econometric modeling tool is highly employed in growth literature in the world and in Turkey. This tool is one of the significant tools for regional growth/ development and used by many researchers in the regional arena.

Econometrics can be defined as the application of statistical methods to economic data (Pesaran, 1987). Econometric models are concerned with measuring how one variable is related to other variables. An econometric analysis begins with the formulation of a mathematical model that is grounded in economic theory. The model is then specified in a form that can be tested with data using selected techniques.

In addition to huge amount of empirical study aiming to determine relation between a single factor and growth, there is significant number of studies focus on dynamics of regional growth. Recently, studies aiming to understand the dynamics of regional growth through identification of its underlying internal and external forces and modeling regional development (Brookfield, 1975; Lucas, 1988; Martin and Sunley, 1998; Plummer and Taylor, 2001a; Coe et al., 2004) emerged.

However, empirical modeling of growth theories is not an easy process, as there is no single best way to describe how to specify an empirical model (Granger, 1999). As the aim is to define whether there is a relation between defined factors (proxies) or not, general-to-specific modeling strategy is preferred to evaluate the models of local economic growth and regional growth. Explanatory power of models built for the determination of the relationship between the dependent variable and the independent variables is related with imitation level of the real world. A model using a limited number of variables cannot fully simulate the real world. For this reason, it is intended in the model to include numerous independents as much as possible by considering inclusion of irrelevant problem which is explained under specification errors section. General-to-specific modeling allows inclusion of huge number of variable and elimination of insignificants.

Within contemporary econometrics, general-to-specific modeling has been widely advocated as an efficient strategy that incorporates both sample and theoretical information in an empirical modeling framework (Spanos, 1990; and Hepple, 1996).

General-to-specific modeling, in fact, is an implication of theory of reduction. The theory of reduction explains the possible losses of information from any given reduction, which are measured by its ability to deliver the parameters of interest in the analysis (Hendry and Krolzig, 2003)

A general-to-specific modeling strategy begins with an over parameterized model that is tested down to a more specific model. This model is subjected to a battery of misspecification tests to establish its congruence with the evidence (Charemza and Deadman, 1997; Kennedy, 1992).

Then, the model is reduced in complexity by eliminating statistically insignificant variables, checking the validity of the reductions at every stage to ensure congruence of the finally selected model. Excluding statistically insignificant variables from the model enables to identify those proxy measures that are statistically significant.

The basic model in the current study is in the form of a linear multiple regression equation which is derived from a simple linear regression model. Simple regression analysis which is used to explain a dependent variable, Y, as a function of a single independent variable, X, could create serious statistical difficulties (omitted variables bias problem which is explained under specification errors section). Multiple regression analysis allows us to explicitly control for many other factors that simultaneously affect the dependent variable. As multiple regression models can accommodate many explanatory variables that may be correlated, it can infer causality in cases where simple regression analysis would be misleading (Wooldridge, 2009).

Empirical model design and analysis has been conducted using PcGive 9.0 model selection computer package programme developed by David Hendry and Jurgen Doornik. The PCGive algorithm tells relevant from irrelevant variables by performing a series of econometric tests. It tests significance of individual variables and their groups, as well as the correct specification of the resulting models. By following all possible reduction paths, the algorithm ensures that results do not depend on which insignificant variable is removed first (Ciccone and Jarocinski, 2008). The output of the PcGive algorithm is the final, specific model, which includes only the variables that have a statistically significant effect on the dependent variable.

Preliminary analyses of dependent factor, GDP per capita growth rate and independent growth factors have been conducted using SPSS 15.0. In order to visualize the main characteristics and progress of proxies a geodatabase is formed. Geographical information system is formed and operated under ARCGIS 9.3.

4.3.2 Specification and Data Issues

In this section, issues related with data and model construction, potential problems in such studies, developed methods for the solution of these problems and the methods used in the study to overcome possible problems are explained.

4.3.2.1 Specification Errors

Drennan and Saltzman (1998) consider five ways in which an econometric model may be misleading:

- Inclusion of irrelevant or extraneous variable,

- Omitting a relevant explanatory variable,

- Missspecifying functional form of the theoretical model,

- Endogeneity and

- Multicollinearity

Definition of these specifications, the results of using ordinary least squares under each of these five types of misspecification and ways to overcome such problems are reviewed in the following section.

Inclusion of Irrelevant or Extraneous Variable

Inclusion of an irrelevant variable or overspecifying the model in multiple regression analysis means that one (or more) of the independent variables, X, is included in the model even though it has no partial effect on dependent variable, Y (coefficient is zero).

Including one or more irrelevant variables in a multiple regression model, or overspecifying the model, does not affect the unbiasedness of the OLS estimators but including irrelevant variables can have undesirable effects on the variances of the OLS estimators (Wooldridge, 2009).

In the study, this problem has been overcome by checking the significance levels of the variables and the coefficient values.

Omitting a Relevant Explanatory Variable

Excluding a relevant variable that actually belongs in the true model, called as omitting a variable problem or underspecifying the model. This problem generally causes the OLS estimators to be biased.

Omitting a variable that theory says should be included in a model has more serious implications than does the error of including an irrelevant explanatory variable. In general, including an irrelevant variable creates a situation where the OLS estimates are unbiased and inefficient; omitting a relevant variable gives rise to a situation where the estimators of both the coefficients and the variances can be biased.

Table 4.1 summarizes the main points of the situation when there is an omission of a relevant variable. The including an irrelevant variable is the easiest one amongst others to treat. In practice, it is not possible to know which model is the appropriate one. One solution to this problem, in general, is to include only the variables that, based on economic theory, affects the dependent variable, and are not accounted for other variables in the model.

In the study, this problem has been overcome by implementing F test (a kind of Wald test) which is embedded in the software programme for this purpose.

Table 4.1   Consequences of Variable Misspecification

		TRUE MODEL	
		$Y = \beta_1 + \beta_2 X_2 + u$	$Y = \beta_1 + \beta_2 X_2 + \beta_3 X_3 + u$
FITTED MODEL	$\hat{Y} = b_1 + b_2 X_2$	Correct specification, no problems	Coefficients are biased (in general). Standard errors are invalid.
	$\hat{Y} = b_1 + b_2 X_2 + b_3 X_3$	Coefficients are unbiased (in general), but inefficient. Standard errors are valid (in general)	Correct specification, no problems

Source: Dougherty (2011).

Functional Form Misspecification

In addition to over specifying or under specifying a model, it is also possible for the functional form of a model to be misspecified. A multiple regression model suffers from functional form misspecification when it does not properly account for the relationship between the dependent and the observed explanatory variables (Wooldridge, 2009).

OLS estimators would, in general, be biased and inconsistent if the variables are specified in wrong functional forms (i.e. linear vs. power function, log vs. log linear) the estimators of the incorrect model will provide incorrect results of the assumed theoretically correct model.

Some tests have been proposed to detect general functional form misspecification. Ramsey's (1969) regression specification error test (RESET) has been proven to be useful in this regard.

The RESET formulation reestimates the original equation, augmented by powers of y (usually squares, cubes, and fourth powers are sufficient) and conducts an F-test for the joint null hypothesis that those variables have no significant explanatory power.

In the analysis, for example, this problem has been overcome by taking standardized values of the independent variables and taking the log of the dependent variables in the equation. Besides the software programme employs RESET test.

4.3.2.2   Multicollinearity

Another type of problem of such studies is data problem. One of the data problems is multicollinearity among the explanatory variables. Correlation among the explanatory variables does not violate any assumptions. When two independent variables are highly correlated, it can be difficult to estimate the partial effect of each. But this is properly reflected in the usual OLS statistics.

To overcome this problem in the study correlation matrix is used. Independent variables highly correlated with other independent variables are omitted. If correlation coefficient is 0.8 (absolute value) or higher among the independent variables, independent variable is replaced to solve multicollinearity problem.

4.3.2.3 Endogeneity Problem

Endogeneity occurs when that relationship is either backwards or circular, meaning that changes in the dependent variable cause changes in the independent variable. In a model, a variable is said to be endogenous when there is a correlation between the parameter or variable and the error term. Broadly, a loop of causality between the independent and dependent variables of a model leads to endogeneity.

This circular relationship, endogeneity has serious consequences for estimates. In the presence of endogeneity, OLS can produce biased and inconsistent parameter estimates. Hypotheses tests can be seriously misleading.

There are strategies for reducing the bias if removing the endogenous variable is not an option. The most common approach to deal with endogeneity concerns is through instrumental variables techniques, using a proxy that does not suffer from the same problem.

In the study, variables are measured at their initial levels in order to limit the potential endogeneity of some of our explanatory variables.

4.3.2.4 Measurement Error

Measurement error is another issue in such studies. Measurement error can be described as the difference between the actual value of a quantity and the value obtained by a measurement. Measurement error occurs if the magnitude of the variable of interest is not accurately measured or there are no data available on the variable of interest. There are two types of measurement error:

- Measurement error in the dependent variable, Y

- Measurement error in the independent variable, X.

In a multiple regression model, the overall measurement error in an explanatory variable produces inconsistency of all the estimators. If there are measurement errors in the explained variable, Y, this makes OLS more inefficient. Measurement error in an explanatory variable, on the other hand, is a far more serious problem (Wooldridge, 2009). If there is measurement error in the independent variable, X, the OLS estimator that regresses Y on X is biased, since X is correlated with the composite error term which will include X.

While random error randomly affecting measurement of the variable across the sample does not affect average performance for the group, systematic error, systematically affecting measurement of the variable across the sample is considered to be bias in measurement.

In addition to lack of data in Turkey, available data sets also include significant problems. First problem, in this context, can be defined as quality of data. Although the data are taken from mainly TURKSTAT which is responsible and authorized institution for data collection and publication and from major institutions in Turkey, there is always a problem with data quality. Data quality is related with definition of data, design of data collection procedure, selection of data generation technique (sampling or census), quality of study at data collection stage, and its analysis and representation. To overcome this problem, many alternative indicators are going to be utilized in order to find out the best variable of a specific theory. Besides, data standardization techniques are employed.

4.3.2.5 Missing Data and Outlying Observations

Another problem is related with missing data and outliers. Missing data problem can be considered as measurement error problem discussed in the previous

If data is missing for an observation on either the dependent variable or one of the independent variables, then the observation cannot be used in a standard multiple regression analysis. In fact, missing data have been properly indicated, all modern regression packages keep track of missing data and simply ignore observations when computing a regression (Wooldridge, 2009)

There are ways to use the information on observations where only some variables are missing, but this is not often done in practice. To overcome missing data problem, data of some variables, thought must be included in the model are get by means of interpolation.

As mentioned above, missing data is a significant handicap for the study. Second problem of available data, is about geographical scale. Some key variables are only available for national or NUTS 1 or NUTS 2 level in Turkey.

Third problem is related with availability of time series data, some of data started to be collected recently or some of data is not collected any more. For example, while GDP data is available at NUTS 3 level for period 1987 to 2001, after 2001, due to decision of board of directors of TURKSTAT, TURKSTAT has not calculating GDP data for NUTS 3 level since 2001. To overcome such problem, interpolation techniques are used to get data of some key proxies whose data is not available for a few years.

An outlier (in correlation analysis) is a data point that does not fit the general trend of data but would appear to be an extreme value and not what you would expect compared to the rest of data points.

Extreme values of observed variables can distort estimates of regression coefficients and can lead to very different conclusions regarding data. Statistically, it's iffy to drop outlying measurements (unless they're gross mistakes) distorts picture of distribution (Wooldridge, 2009). A linear relationship with an outlier and after its removal is illustrated in Figure 4.3.

Outliers can be detected by simply plotting the two variables against each other on a graph and visually inspecting the graph for extreme points.
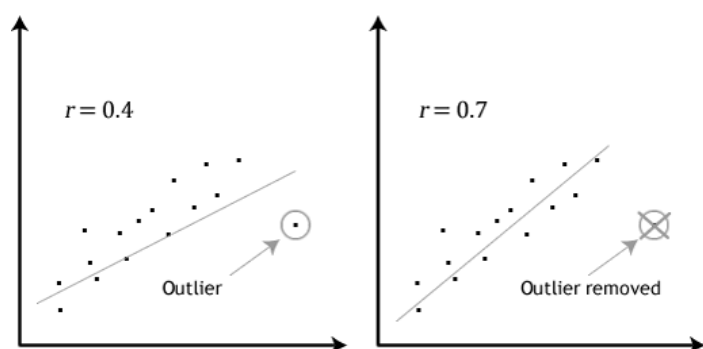
Figure 4.3   Linear Relationship with an Outliner and After Outliner Removed

The econometric approach enables the researcher to identify the outliers in the dataset. Outlier detection is one of the major tasks of data analysis that aims to identify abnormal patterns (outliers) from large data sets.

In spatial studies identification of spatial outliers is a significant task to identify anomalies in a spatial context. Spatial outliers represent locations which are significantly different from their neighborhoods even though they may not be significantly different from the entire population (Shekhar, Lu and Zhang, 2003). Detecting spatial outliers is possible in many applications of geographic information systems and spatial databases. In the study, spatial outliers defined by using ArcGIS software. Besides, the option detecting and removing outliers under PCGive is used to exclude outliers.

4.3.2.6 The Variance of the Error Term

The OLS estimator is computed under homoscedasticity or constant variance assumption. This assumption states that the variance of the unobservable, u, conditional on x, is constant (Wooldridge, 2009). This assumption means that the variance around the regression line is the same for all values of the predictor variable, X (Figure 4.4a). The failure of this assumption is known as heteroscedasticity, implying that variances are now unique (Figure 4.4b). Homoscedasticity basically means that the variances along the line of best fit remain similar as you move along the line.

(a)   (b)
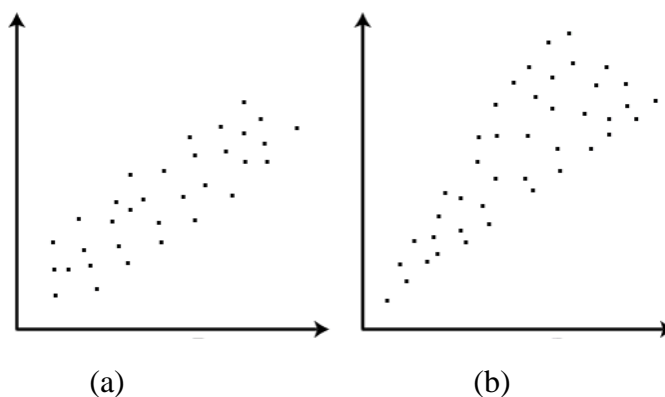
Figure 4.4   Illustrations of (a) Homoscedasticity and (b) Heteroscedasticity

Effects of heteroscedasticity on ordinary least square estimators:

- OLS estimators are unbiased and consistent in the presence of heteroscedasticity,

- OLS estimators are not efficient and the estimated standard errors are inconsistent.

There are several tests to determine heteroscedaticity such as eye-ball test, Breusch-Pagan test, White test and Goldfeld-Quandt test. At a visual level, heteroscedasticity can be detected by examining the plot of residuals against predicted values or individual explanatory variables.

Deflating variables by some measure of size and transforming the data by taking logs are some possible solutions for heteroscedasticity. In the study these solutions are used.

4.3.2.7   Using Proxy Variables for Unobserved Explanatory Variables

As discussed in specification errors section, a more difficult problem arises when a model excludes a key variable, usually because of data unavailability. In order to control unobserved variable, and to avoid omitted variable bias in model, one possibility is to obtain a proxy variable which is a variable related to the unobserved variable.

As mentioned above, the main problem of such studies is translating measures to proxies. This is a common problem of empirical studies testing highly abstracted theories. This problem has been perceived even more since 1970 after when theories formed emphasized intangible factors. As mentioned in Chapter Two, intangible, immeasurable factors are highly emphasized by contemporary regional development theories. Therefore, proxy variables are highly employed in the study.

4.3.3   *The Choice of the Development Factors, Proxies and Data Sources*

Defining and choosing proxies that best express intangible factors and limits of available or attainable data are two main constraint of the study. Although regression analysis which includes some limitations is the mostly used tool for defining regional development factors, there is no consensus on proxies for measuring effect of factors to development and proxies for them.

The development factors mentioned in theoretical literature are broadly reviewed in Chapter Two. As mentioned Chapter Two, boundaries between theories are not so clear and making an exact distinction is not possible and theories slightly vary according to defined growth factors but differ according to emphasized factors. After defining all factors for each theory, some general factors eliminated and factors make sense and specific to the theory are kept. Factors make sense and specific to theories are given in Table 2.15.

Although Chapter Two highlights the problems and possibilities of translating the propositions contained in theoretical literature into measurable dimensions and to determine development, theoretical literature and empirical studies that are summarized in Appendix A also guide to clarify proxies.

In order to select proxies that reflects factor ideally, factors and indicators identified in empirical studies defined and data availability for relevant NUTS 3 regions are checked.

In addition, statistics issued by the relevant authorities were checked for the presence long-term data for factors and proxies. This includes published or unpublished data compiled by TurkStat and related institutions.

Analysis period is defined by considering historical progress of regional development policies implemented in Turkey. As mentioned in Chapter Three, 1980 and 2000 are turning points for Turkey. 1980s became the turning point of Turkish regional policy. Before 1980, state was the only actor and direct public investments were the main policy tool. After 1980, direct public investments lost significance and local dynamics and investments, regulations that support local dynamics has gained importance. The shift from state led development to neo-liberal economic policies at the national level caused a change in classical regional policies to export promotion assistance to regions.

After 2000, efforts for integration with the European Union and localization efforts have increased. In this context; emphasis were placed on activities towards increasing the consistency and effectiveness of policies at the central level, creating a development environment based on local dynamics and internal potential, increasing institutional capacity at the local level and accelerating rural development. New laws were adopted to assign new roles to local governments and increased the resources of local governments.

Therefore analysis period is defined as 1980-2008. This period also divided into two sub periods which are 1980-2000 and 2000-2008.

The dependent variable in the analysis is selected as the annualized growth rate of GDP per capita between 1980 and 2008 for 81 NUTS 3 regions. GDP per capita data for 1987-2001 are gathered from TURKSTAT database, GDP per capita data before 1987 are taken from Özötün (1998). There is no GDP value after 2001, but GVA per capita data exists for 2004-2008 and for NUTS 2 level. By using GDP share of NUTS 3 regions in NUTS 2 region, NUTS 2 regions GVA values transferred to NUTS 3 regions.

Practical limitations on consistent data availability are the main decisive in selection of proxies. So variables measured as closely as possible to the beginning of the sample period (which is 1980) are chosen and all those variables that were computed only for the later years are eliminated. This leads to the exclusion of some widely used variables. This is partly done to deal with the endogeneity problem.

Collected data is standardized by using variables (i.e. population, employment, area etc.) depending on the nature of proxy. Besides some data proxies are normalized or log of proxies are used. Price data are translated into fixed prices by using price deflators published by TurkStat and SPO.

Thirteen proxies are defined as growth factor for five groups of theory. Table 4.2 shows growth drivers, definition of proxies and data source.

Table 4.2   Growth Drivers, Proxies Definition and Data Source

Growth Factor	Proxy	Abbreviation	Unit	Definition	Source of Data	Year
Dependent Variable: Growth	GDP per capita growth	GDPPCG	Numeric	GDP per capita growth	Calculated from TURKSTAT, 2012a and Özötün, 1998,	1980-2008
Initial condition	Initial GDP per capita	IGDPPC	TL, 1987 prices	GDP per capita of year 1980	Calculated from TURKSTAT, 2012a	1980
Production factor labor	Share of labor force	ShLabFor	Numeric	Share of labor force in total population	TURKSTAT, 2012b; TURKSTAT, 2012a	1985
Capital and saving	Bank deposit per capita	DepPC	USD	Bank Deposit per capita	The Banks Association of Turkey, 2012	1988
Public Expenditure	Total public expenditure per capita	TPubExp	TL, 2010 prices	Total public expenditure per capita	Calculated from SPO,2011a; SPO, 2011b, TURKSTAT, 2012a and TURKSTAT, 2012b	1983
Government incentive	Incentive fixed investment per capita	TIncInvPC	TL, 2010 prices	Total incentives investment per capita	Calculated from Ministry of Economy, 2012c, TURKSTAT, 2012a and TURKSTAT, 2012b	1980
Government intervention	Being within the scope of Priority Regions in Development	PRD	Numeric	Being within the scope of Priority Regions in Development as per related regulations (0=NO, 1=YES)	Own Calculation	1980
Agglomeration on a specific sector	Herfindahl concentration index	HerfConc	Numeric	Calculated based on regional GDP data for industry subsectors (mining, manufacturing and electricity, gas and water), the formula of the Herfindahl specialization index used is $$H_j^c = \sum_{i=1}^{n} (g_{ij}^C)^2$$ where i – region; j- sub sub-sector $g^c{}_{ij}$ - the share of region i in the total national value of sub-sector j	Calculated from TURKSTAT, 2012a	1987

Table 4.2 (continued)

Growth Factor	Proxy	Abbreviation	Unit	Definition	Source of Data	Year
Accumulation of knowledge	Thesis per million population	NThPC	Numeric	Thesis (M.Sc, Ph.D., Medical specialty thesis and doctoral thesis in art) available at The Council of Higher Education (CHE) Library per million population	Calculated from CHE Library	1980
Jointly used infrastructure	Number of OIZ plot	NOIZPl	Numeric	Number of OIZ plots (including OIZ constructed by state, entrepreneurs and plot of SIE's plots transformed to OIZ)	Calculated from Cansiz, 2010 and OSBUK, 2011	1980
Specialization	Herfindahl specialization index	HerfSpec	Numeric	Calculated based on regional GDP data for industry subsectors (mining, manufacturing and electricity, gas and water), the formula of the Herfindahl specialization index used is $$H_i^s = \sum_{j=1}^{m} (g_{ij}^s)^2$$ where i – region; j- sub sub-sector g^s_{ij} - the share of sub-sector j in the total value of region i.	Calculated from TURKSTAT, 2012a	1987
Trust	Established new foundations million population	EstFounPC	Numeric	Established new foundations per million population	General Directorate of Foundations, 2012	1980
Skilled human capital	Share of university graduate	ShUniGr	Percent	Share of university graduate in 22 and above age	TURKSTAT, 2012a TURKSTAT, 2012b;	1985
Innovation/ R&D capacity	Number of universities	NUniv	Numeric	Calculated by considering only location of university president (faculties, institutes and department at other provinces are ignored)	Calculated from CHE 2012c	1980

CHAPTER 5

MAIN CHARACTERISTICS OF THE PROXIES

5.1   Introduction

This chapter discusses the main characteristics of variables that are used in the study for Turkey and NUTS 3 level. Analyzing main characteristics and development process of proxies at both national and NUTS 3 level has significant contribution to comprehend the differences in regional development for Turkey. This analysis also guide during the interpretation of the model results.

Firstly, GDP per capita and GDP per capita growth rate are reviewed for the analyzed period (1980-2008) at national and NUTS 3 level. Then, main characteristics of used proxies are analyzed for 1980-2008 period under four headings:

- Intervention,

- Traditional production factors,

- Innovation, soft infrastructure and networking,

- Agglomeration and specialization.

5.2   GDP per Capita and GDP Per Capita Growth

GDP and GDP per capita values are the basic indicators reflecting the economic development. Although it is intended to treated GDP per capita developments on the basis of 1980-2008 time series, the available data published by TurkStat covers the period of 1987-2006 for Turkey and NUTS 3 data is more limited, the NUT 3 data expands until 2001. GDP data for 1980-1986 period is obtained from Özötün (1998). As, mentioned in Chapter Four there is no GDP value after 2001, but GVA data exists for NUTS 2 level and for 2004 - 2008. By using 2000 GDP share of NUTS 3 regions in NUTS 2 region, NUTS 2 regions GVA values transferred to NUTS 3 regions. For the purpose of monitoring the growth, GDP values have been converted to 1987 fixed prices.

Because of the weakness and instability of political structures from the 1970s, Turkey had difficulties to keep up with the global world and to take the measures necessary for stable growth. Turkey's economy began to open out after 1980 and significant increase occurred in import and exports. Removal of obstacles to capital movements without achieving budget balance in the second half of the 1980s caused increase in economic fluctuations. Turkey experienced three major internal and external rooted economic crises after 1990 (1994, 1999, and 2001).

Figure 5.1 summarizes the general performance of the Turkish economy in terms of GDP per capita, several fluctuations can be observed in the period of 1987-2008. In the analyzed period, GDP per capita of Turkey increased from TL 1 124 003 in 1980 to TL 3 915 933 in

2008. GDP per capita of Turkey is increased continuously between 1980 and 1988, between 1994 and 1998 and after 2001. These periods can be defined as stabile periods in terms of GDP per capita. On the other hand, performance of GDP per capita shows great fluctuations due to the economic instability and crises (Figure 5.1).

The Turkish economy has suffered higher rates of inflation in the last 25 - 30 years. This may be called fluctuating development process. Large deficits in public finance, exorbitant interest rates, and financial crises and slow-downs of the increase in the productive capacity of the economy may be cited as the characteristics of this process.
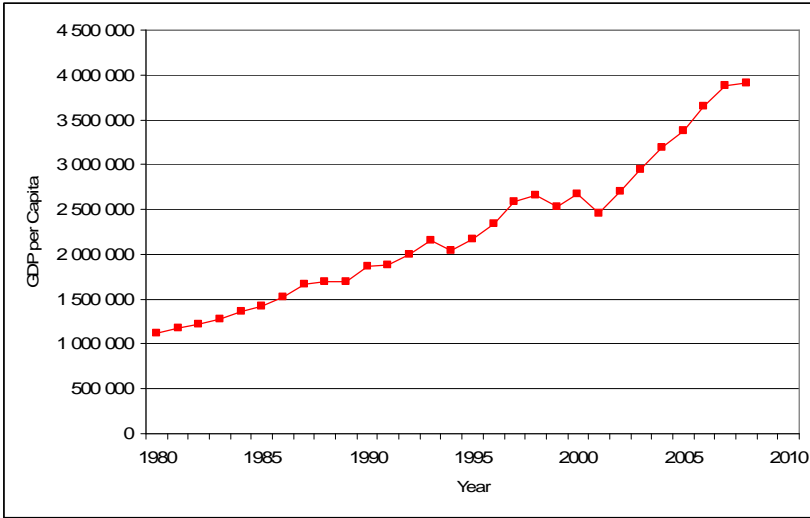
Figure 5.1   Changes in GDP Per Capita of Turkey (1987 Fixed Prices), 1980-2008

Although GDP per capita of Turkey has performed significant growth, currently the GDP per capita is very low compared with EU and OECD countries. GDP per capita in purchasing power parity of Turkey is about 48 % of EU-27 (EU, 2011a). Similarly GDP per capita in purchasing power parity of Turkey is approximately 41 % of OECD countries (OECD, 2011).

Analyzing GDP per capita at NUTS 3 level for the period of 1980-2008 shows that, fluctuations at GDP and so GDP per capita at Turkey scale is also valid at NUTS 3 scale. Economic instability and crises cause wave motion on GDP per capita at NUTS 3 level regions.

Geographical representation of 1980 GDP per capita data by NUTS 3 regions shows gradually decreasing pattern from west to east in Turkey (Figure 5.2). The figure refers to values at fixed 1987 prices in Turkish liras and provides an understanding of comparative income levels of the NUTS 3 regions in Turkey between years 1980 and 2008.
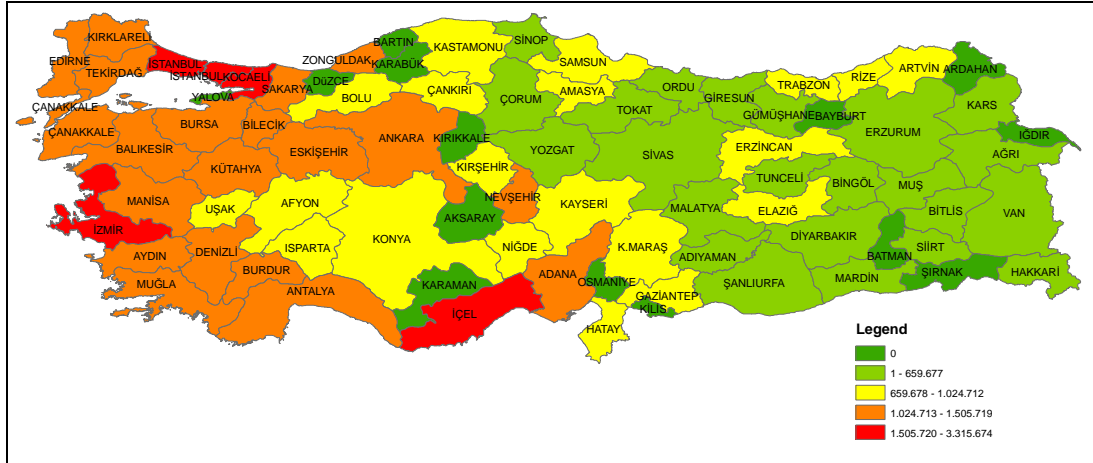
Figure 5.2   GDP per Capita by NUTS 3 Regions (1987 Fixed Prices), 1980

GDP per capita of NUTS 3 regions for 2000 and 2008 are illustrated in Figure 5.3 and 5.4 respectively. As can be seen from Figure 5.2, 5.3 and 5.4, GDP per capita pattern of NUTS 3 regions has not changed since 1980.

As GDP per capita indicator is a composite result of population and GDP, changes in these two variables cause to changes in GDP per capita. Although there has been migration from east to west in Turkey for several decades, low level of GDP per capita at east could not converge to west. Turkey has performed significant development in terms of GDP per capita, but GDP per capita growth rate is differentiated by regions (Figure 5.5).
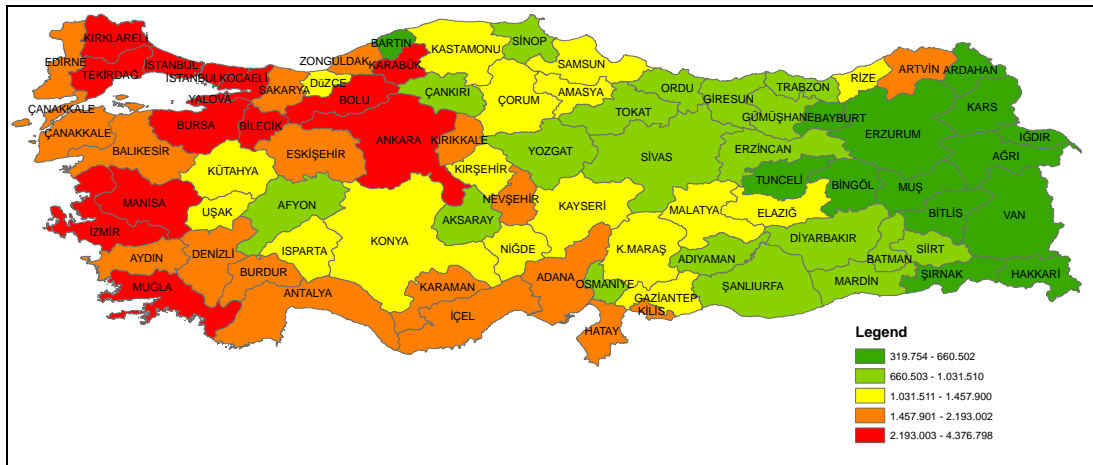
Figure 5.3   GDP Per Capita by NUTS 3 Regions (1987 Fixed Prices), 2000
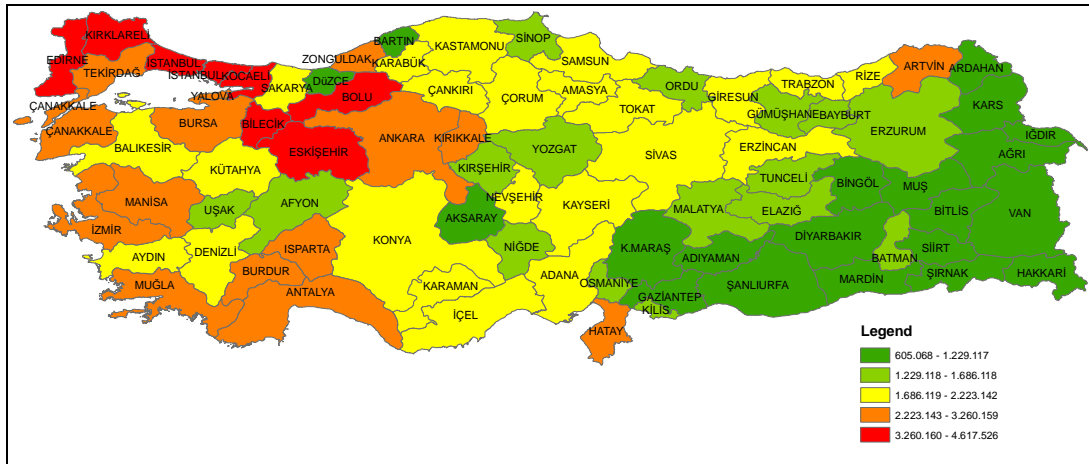
Figure 5.4   GDP per Capita by NUTS 3 Regions (1987 Fixed Prices), 2008

While, Kırklareli, Manisa and Bilecik were the NUTS 3 regions performing highest rate of GDP per capita growth between 1980-2000, NUTS 3 regions at East Anatolia region have performed low GDP per capita growth, besides Mersin, Muş and Hakkari have performed negative growth in this period (Figure 5.5).
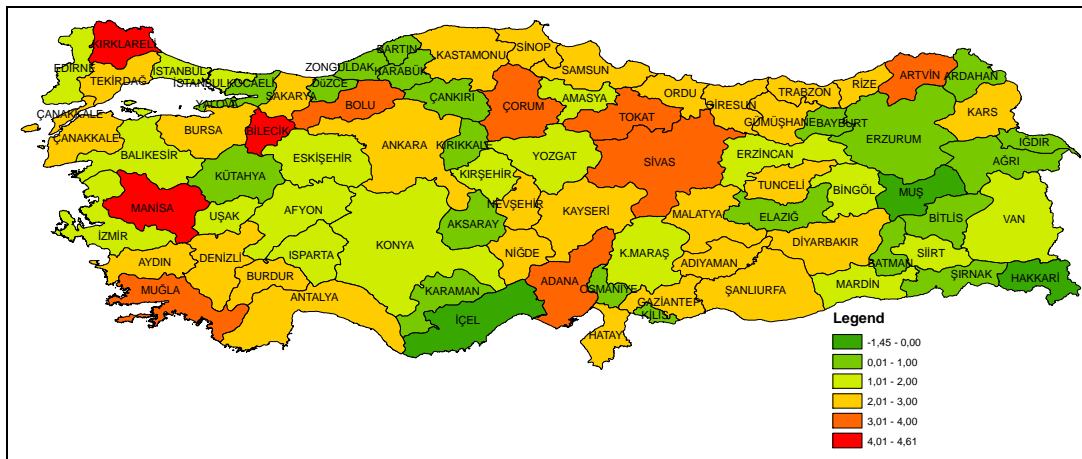
Figure 5.5   GDP per Capita Growth by NUTS 3 Regions, 1980-2000

On the other hand, the growth pattern by NUTS 3 regions was significantly changed after 2000. NUTS 3 regions at East Anatolia which had the lowest growth rate for 1980-2000 period, have performed highest rate of GDP per capita growth between 2000-2008 (Figure 5.6).
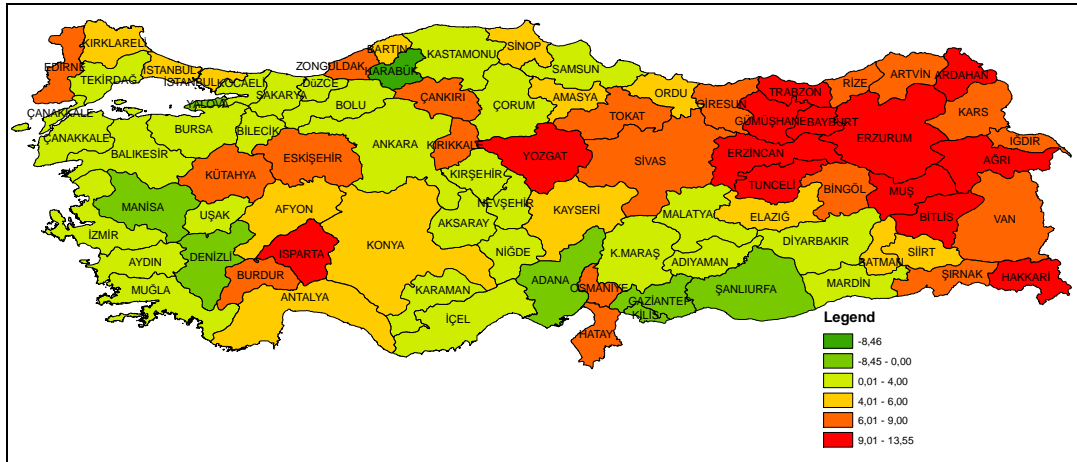
Figure 5.6   GDP per Capita Growth by NUTS 3 Regions, 2000-2008

From another point of view, GDP per capita growth by NUTS 3 regions for 1980-2008 period, NUTS 3 regions at South East Anatolia, East Mediterranean Cost, Aegean and Marmara have performed low GDP per capita growth (Figure 5.7).
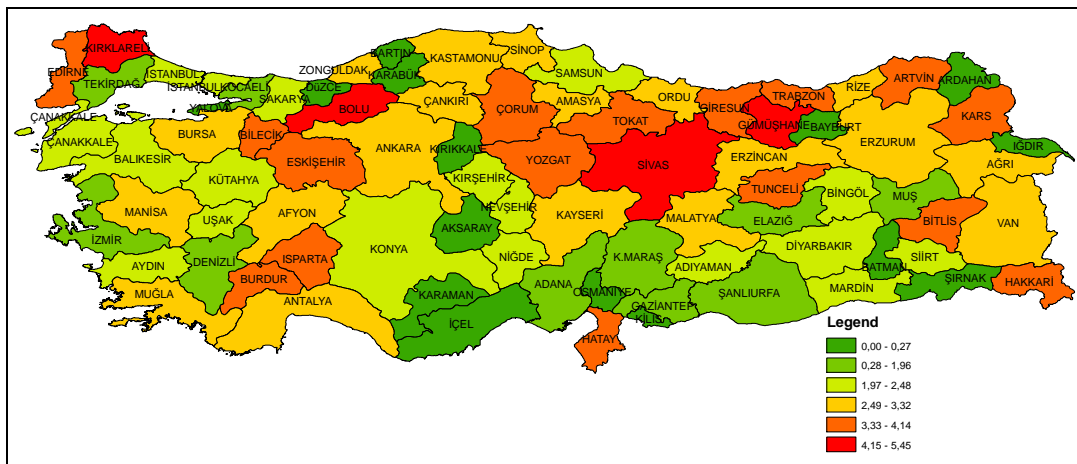
Figure 5.7   GDP per Capita Growth by NUTS 3 Regions, 1980-2008

Despite some stability in relative positions, it is easy to pick out regions that have done exceptionally well and others that have done badly. There is an enormous range in observed growth rates (0.27 – 5.45). To show this, initial GDP per capita and GDP per capita growth is analyzed for 1980-2008 period, four groups can be defined:

- Regions having low initial GDP per capita and performed low GDP per capita growth,

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- Regions having low initial GDP per capita and performed high GDP per capita growth,

- Regions having high initial GDP per capita and performed low GDP per capita growth,

- Regions having high initial GDP per capita and performed high GDP per capita growth.

These four groups are illustrated in Figure 5.8.
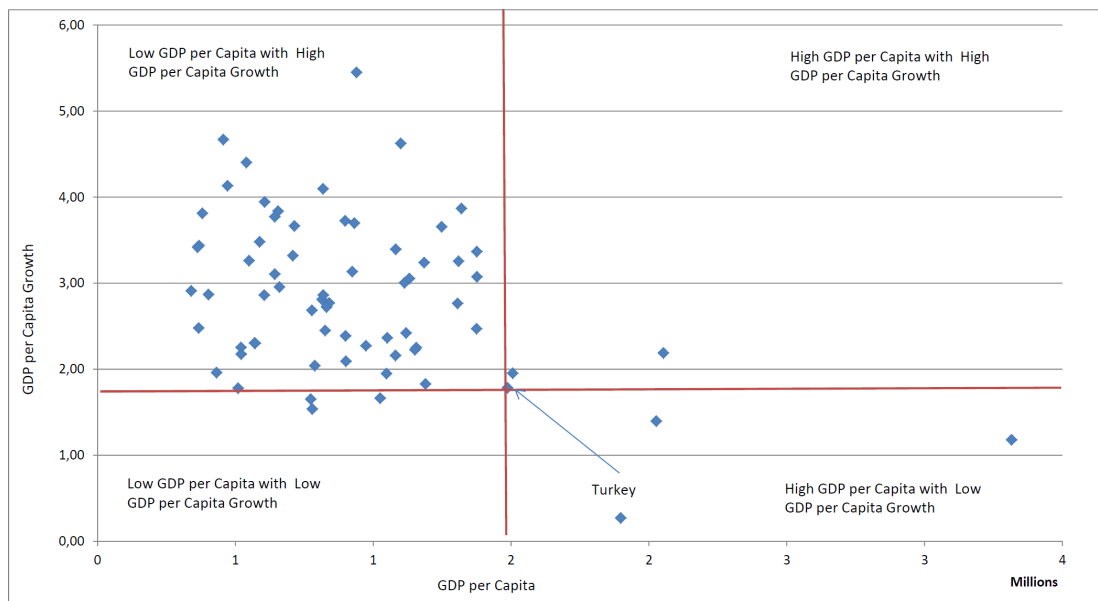
Figure 5.8   GDP per Capita (1980) and GDP per Capita Growth (1980-2008) by NUTS 3 Regions

Seven regions among sixty-seven regions whose 1980 GDP per capita data is available (as there were sixty-seven NUTS 3 regions in 1980) have performed lower GDP per capita growth than Turkey's average. While only two regions having high GDP per capita performed high growth rate, three regions having high GDP per capita performed low growth rate. Most of the regions having low GDP per capita performed higher GDP per capita growth than Turkey's average (Figure 5.9).
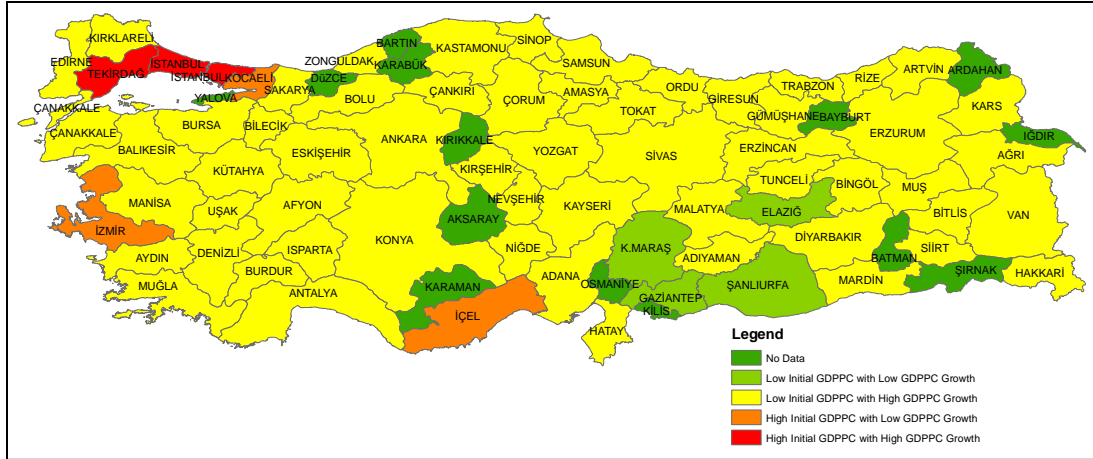
Figure 5.9   GDP per Capita (1980) and GDP per Capita Growth (1980-2008) by NUTS 3 Regions

5.3   Intervention

Total Public Investment

In Turkey, public investment, particularly public infrastructure and social investment, is recognized as the most important determinant of capital accumulation, therefore development.

Public investment in Turkey as covered by SPO publications are composed of two separate values on the basis of provinces. The first value involves public investments for which respective provinces are known and they are defined as "excluding the miscellaneous category". The other value entails "miscellaneous" investment covering multi provinces.

Time series for fixed prices are needed to monitor and evaluate the trends by public investment over time, namely their real course of growth. Figure 5.10 provides nationwide investment figures based on the definitions given above at fixed prices (at 2010 prices).

A historical exploration in Turkey public investment, one of the turning points is observed in the early 1980s. During this period, with the start of the transition from inward-looking import substitution to export-oriented and outward-looking structure, structure of public investment policies and priority sectors in public investments have begun to change. In general, the rule is left to national or global private equity actors. Private sector aiming financial profitability directed to investments brings high levels of return. Public sector aimed social profitability and began to intensify areas that are seen unprofitable by private sector, particularly infrastructure investment.

A historical exploration of public investment in 1983 - 2008 period, brings an initial detection which is public investment has increased approximately 17.8 % in the period. Analyzing the historical development of public investment shows that, total public investment increased in the 1983-2008 period, but growth is not in a stable structure.

By means of analyzing the historical development of public investment it is possible to monitor 1987, 1994 and 2001 crises on deeps, on the other hand, peak points occurred mostly in election years. In the analyzed period, the lowest public investment (TL 15.93 billion, 2010 prices) with the effect of the 1994 crisis was seen in 1995.
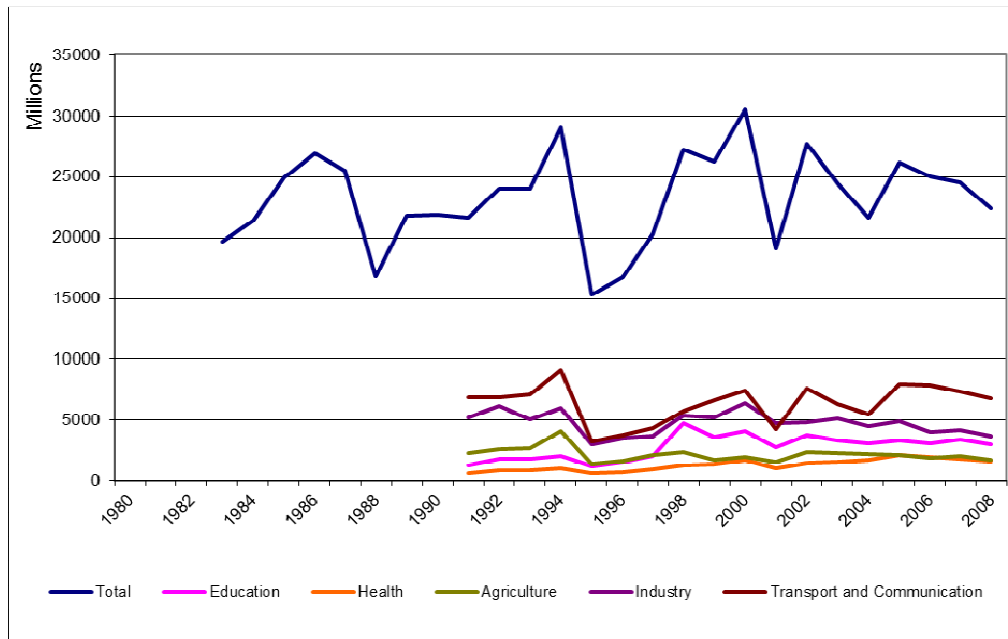
Figure 5.10   Changes in Public Investments in Nationwide (2010 Fixed Prices), 1991-2008

Total amount of public investments increased in the investigated period, but public investment per capita decreased about 23.2 % between 1983-2008, besides as it can be seen from Figure 5.10, public investment per capita tends to decrease.

Per capita public investment by NUTS 3 regions, as of 1983 is given in Figure 5.11. Regions receiving the highest per capita public investment are composed of both developed and undeveloped regions. Similarly regions receiving the lowest per capita public investment are evenly distributed in Turkey. On the other hand, as noted above, ongoing or completed large cost public projects are very important for the distribution pattern of investment to NUTS 3 regions. Effect of large scale projects on the distribution pattern can be observed in Figure 5.12 which illustrates public investment per capita of the year 2008 by NUTS 3 regions,
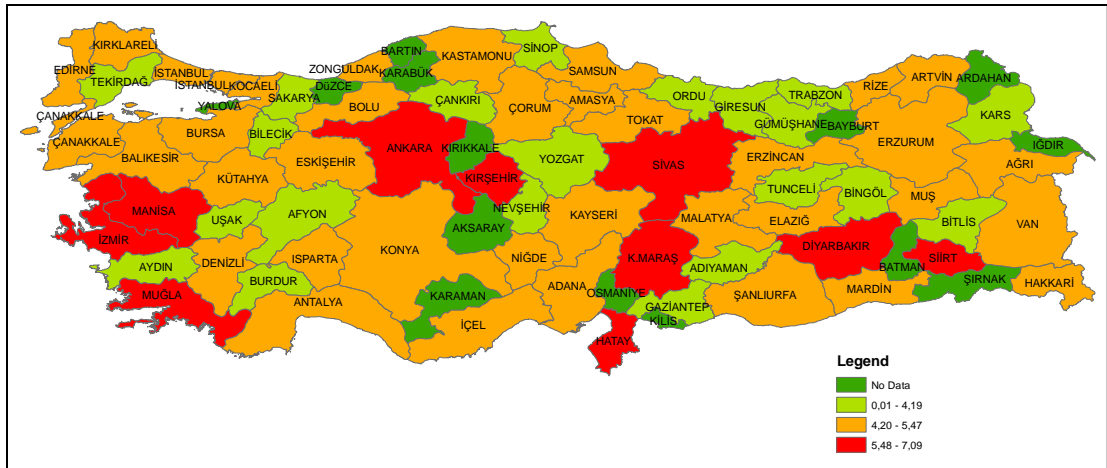
Figure 5.11   Public Investment per Capita by NUTS 3 Regions (2010 Fixed Prices), 1983
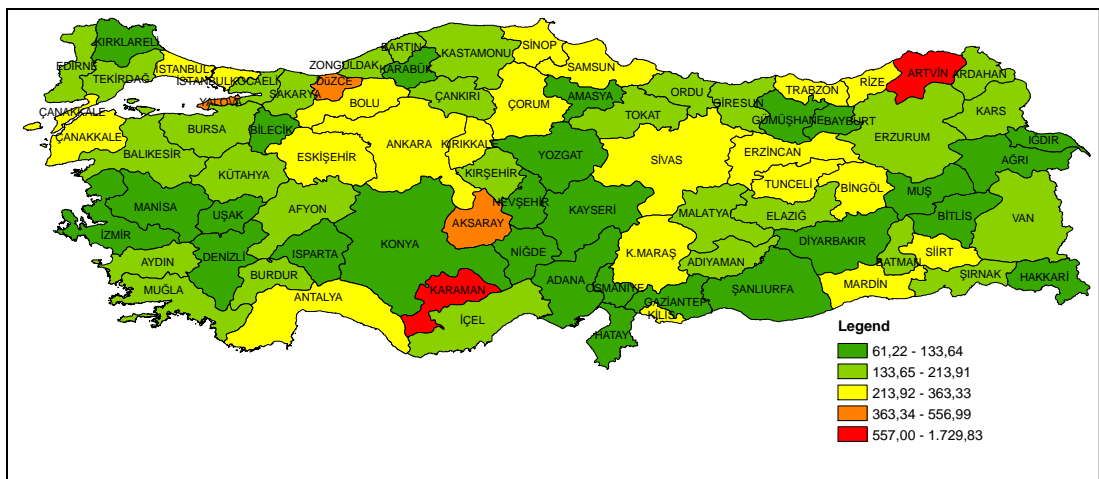
Figure 5.12   Public Investment per Capita by NUTS 3 Regions (2010 Fixed Prices), 2008

Incentive Investment

There are no time series data on total investment on regional basis and also, distraction of investment between the public and private sectors is not known. Most times, "incentives" are referred to as the most appropriate source of data on private sector investment. Namely, actual investment is suggested as a source of data on private investment depending on the incentive measures which are implemented in certain periods.

Public investment accounted for about 30 percent of total investment in Turkey as the rest, was claimed by private sector investment. The share by the public sector in investment falls below 20 percent from time to time (DPT, 2004a). Government investment incentive is significant to guide private sector investments.

The amount of investment incentive per capita on national scale, which was TL 341.4 in 1980 and TL 574.8 in 2008 (Figure 5.13). This increase is not a result of steady increases every year. The investment incentive per capita showed significant fluctuations. The amount was reached to top level in 1995 but entered into a downward trend.
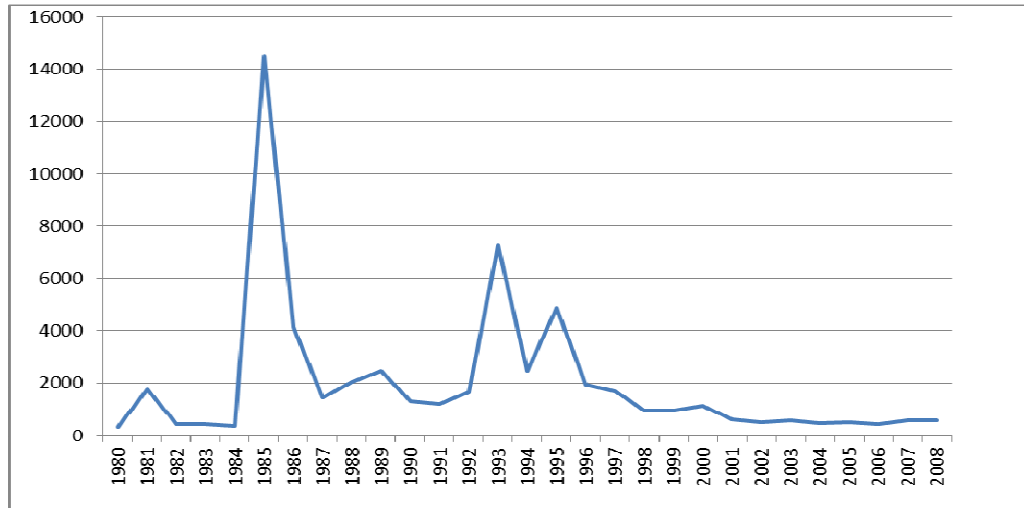
Figure 5.13   Incentive Investment per Capita (2010 Fixed Prices), 1980-2008

As can be seen from the Figure 5.14, mostly developed NUTS 3 regions received incentive investments in 1980. This pattern has not changed too much since 1980.
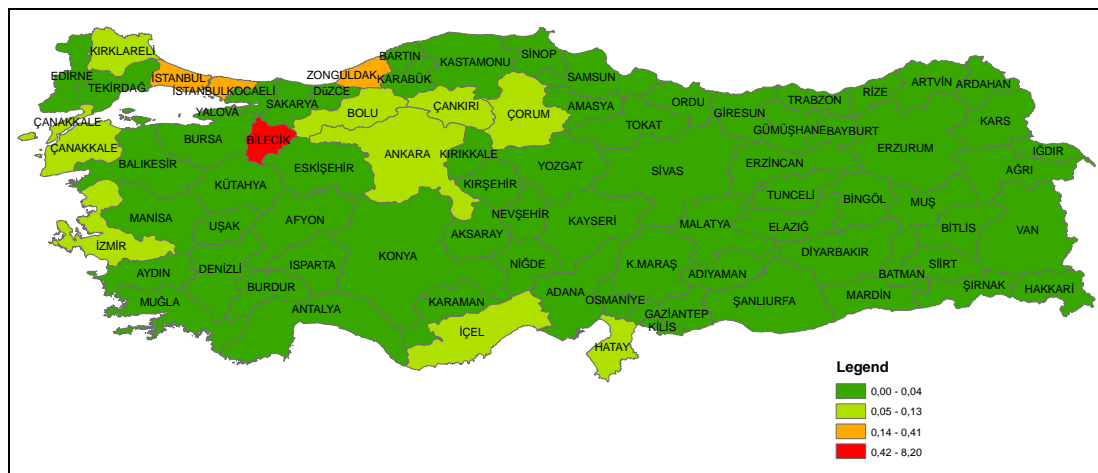
Figure 5.14   Incentive Investment per Capita by NUTS 3 Regions (2010 Fixed Prices), 1980

Priority Regions in Development

Another government intervention is the concept of priority regions in development (PRD) which regulates the geographical distribution of incentives. The idea behind the designation of less-developed provinces as priority regions in development was improve investment conditions and increase attractiveness by offering various investment incentives such as tax discounts and preferential interest rates.

Although it is argued that several indicators used for objective determination increase in the number of provinces designated as PRD since 1968 can be explicated as political impress on decisions.

Figure 5.15   Priority Regions in Development as of 1980

Forty provinces were defined as PRD in 1980 which means only twenty seven provinces were not included in PRD (Figure 5.15). This number reached to forty-nine in 2008 (Figure 5.16). In 1980, PRD were concentrated in east of Turkey, but there were also provinces from the west, however in 2008, PRDs –except Karaman- were located in east of the axes from Zonguldak to Adana. As mentioned in Chapter Three, this pattern shows the political process for the choice of PRD.

Figure 5.16   Priority Regions in Development as of 2008

5.4   Traditional Production Factors

Bank Deposit

Turkey experienced significant increase interms of bank deposit per capita. Deposit per capita increased about 958.58 % between 1988-2008. Development pattern can be examined in three periods

- 1988 – 1994 stagnation period

- 1995 – 2001 slow development period

- 2001 – 2008 fast development period

Development pattern of per capita bank deposits is similar to GDP per capita. Crisis can be observed in deposit per capita chart (Figure 5.17).
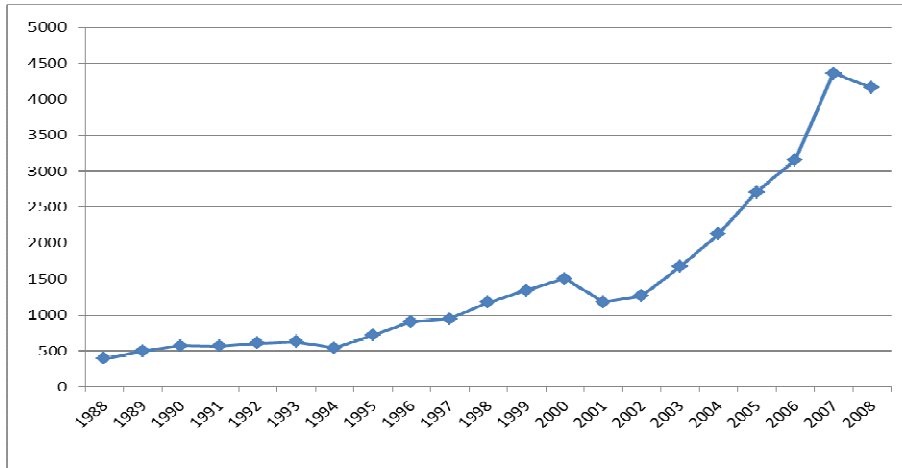
Figure 5.17   Changes in Bank Deposit per Capita at Nationwide (USD), 1988-2008

According to 2008 data, NUTS 3 regions with highest bank deposits per capita are Ankara, İstanbul, İzmir, Muğla, Antalya and Eskişehir (Figure 5.18). Ankara and İstanbul, also, are the regions with highest credit per capita. NUTS 3 regions located at East Anatolia have the lowest bank deposits per capita.
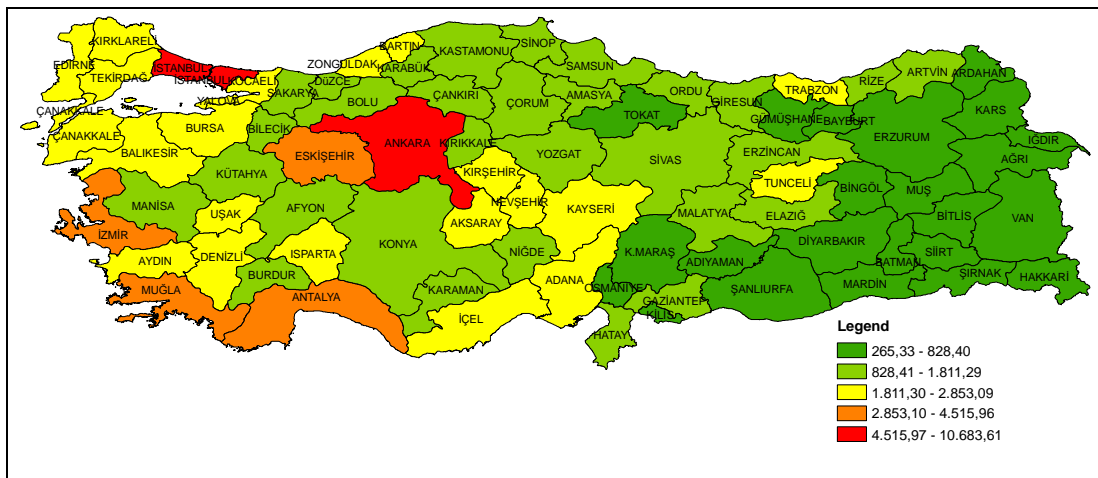
Figure 5.18   Deposit per Capita by NUTS 3 Regions (USD), 2010

Share of Labor Force

The share by the age group of 12+ in the total population performed a rise in Turkey in the last 30 years but the share of labor force in total population has not changed.

According to 1980 data, NUTS 3 regions with the lowest share of labor force are located at South Anatolia, Central Anatolia. NUTS 3 regions with the highest share of labor force in total population are noticed in Thrace, Mediterranean Sea and Black Sea Cost (Figure 5.19).
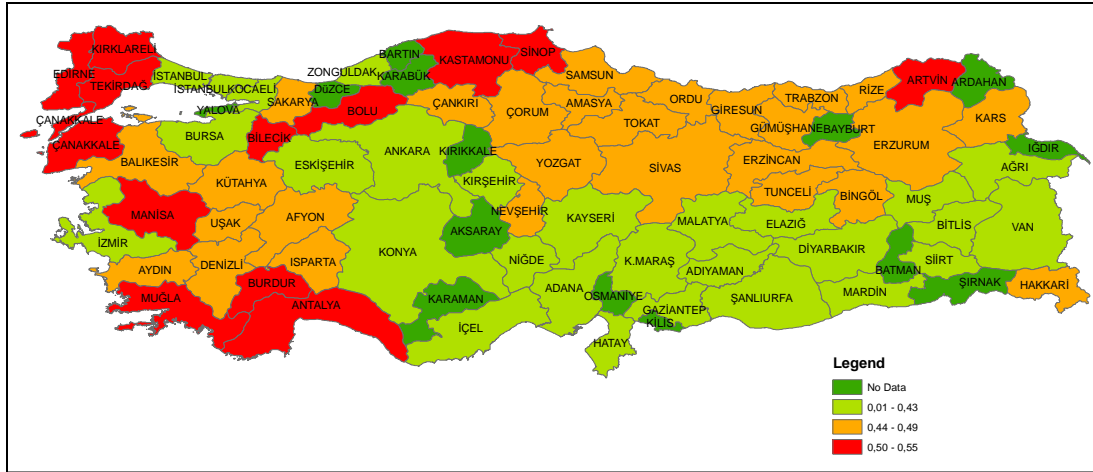
Figure 5.19   Share of Labor Force in Total Population by NUTS 3 Regions, 1985

Number of Organized Industry Zone Plot

Number of Organized Industry Zone (OIZ) plot has been increased since 1980. Changes in the number of OIZ plot can be investigated at four periods (Figure 5.20). The 1980-1986 period is the stagnation period, there is almost no change in the number of OIZ plot. During 1986-2001 slow increase occurred in the number. Significant increase happened in 2001 and total number increased about 55.82 %, but this increase did not occur in all NUTS 3 regions. The increase is just a reflection of increase in İstanbul (755.08 %) and Ankara (134.21 %). After 2002 slow increase continued.
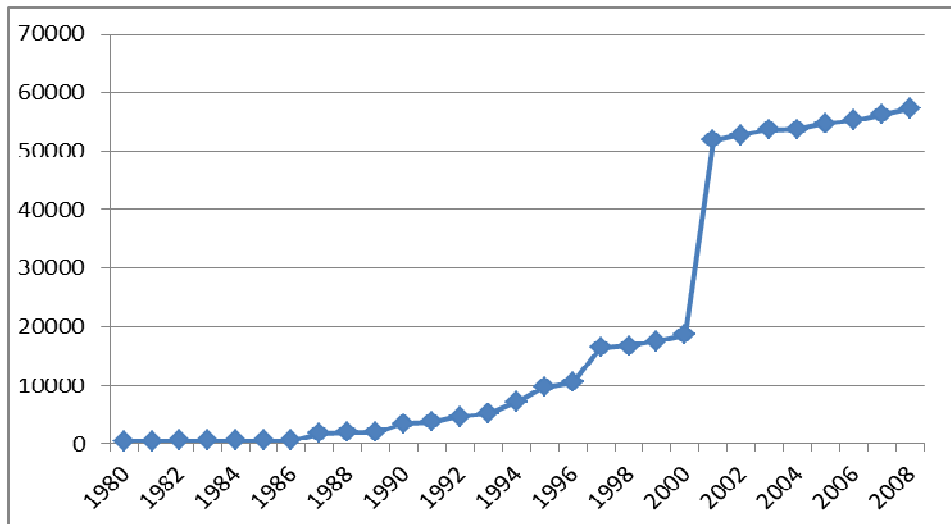
Figure 5.20   Development of OIZ Plot Numbers in Nationwide, 1980-2008

Western dominated polarization policies were applied for selection of industrial sites and there were OIZ in only three NUTS 3 regions in 1980 (Figure 5.21) but number of OIZ plots by NUTS 3 regions as of 2008 (Figure 5.22) show a more balanced spatial distribution as a result of spreading of industries from OIZ concentrated districts to other neighboring provinces and local industrialization movements in some Anatolian cities. NUTS 3 regions at East Anatolia and East Black Sea have lowest number of OIZ plots.

Figure 5.21   Number of OIZ Plot by NUTS 3 Regions, 1980
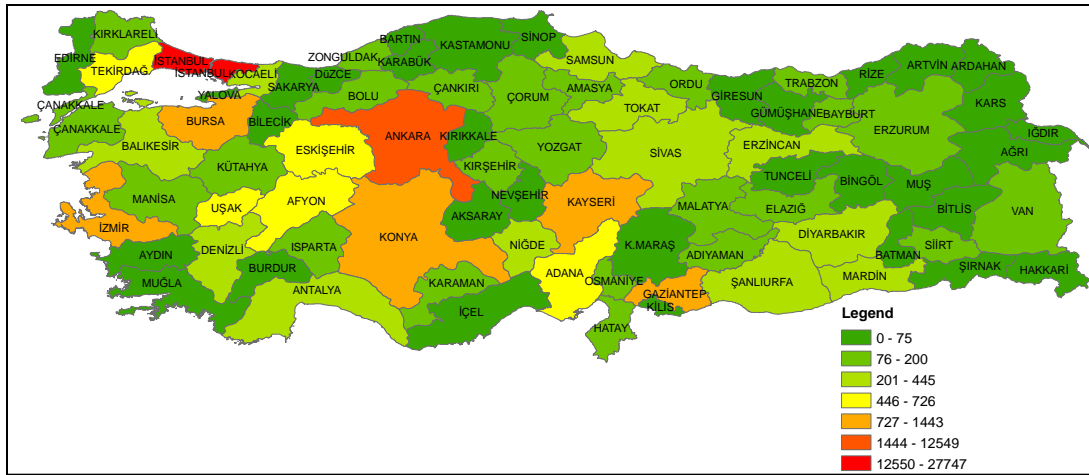
Figure 5.22   Number of OIZ Plot by NUTS 3 Regions, 2008

5.5   Innovation, Soft Infrastructure and Networking

Number of University

The number of universities has been significantly increased in Turkey since 1980 (Figure 5.23). There were 22 universities mainly located in three metropolitan areas (İstanbul, Ankara, İzmir), in 1980. The number increased to 126 in 2008 and distributed to the entire country. The number was sharply increased in 1991 and after 2005.
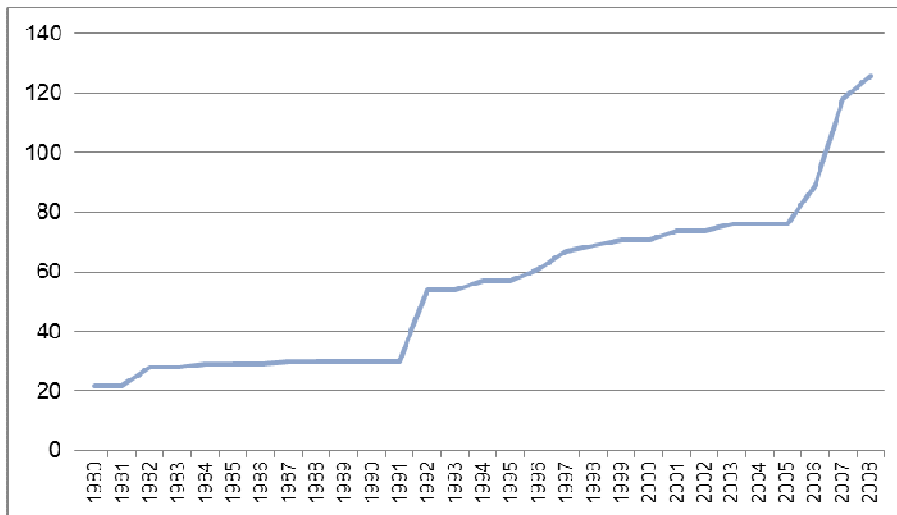
Figure 5.23   Changes in the Number of Universities in Turkey, 1980-2008

As mentioned above, in 1980, universities were located mainly in metropolitan cities; and there were universities established in some Anatolian cites to disseminate higher education entire country (Figure 5.24).
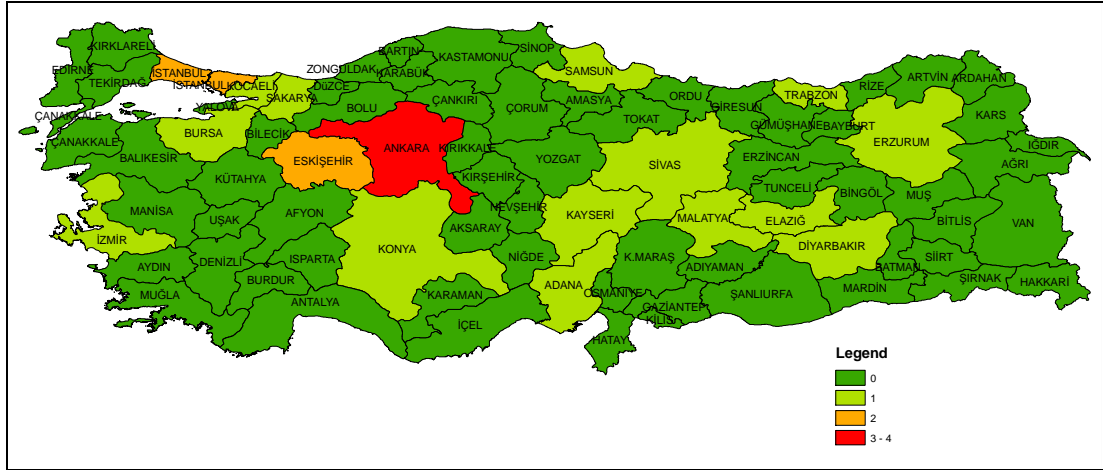
Figure 5.24   Number of Universities by NUTS 3 Regions, 1980

The number of universities in metropolitan cities has significantly increased since 1980, but due to a political decision, universities have also been established in each province since 2005. Figure 5.25 illustrates this new pattern by NUTS 3 regions.
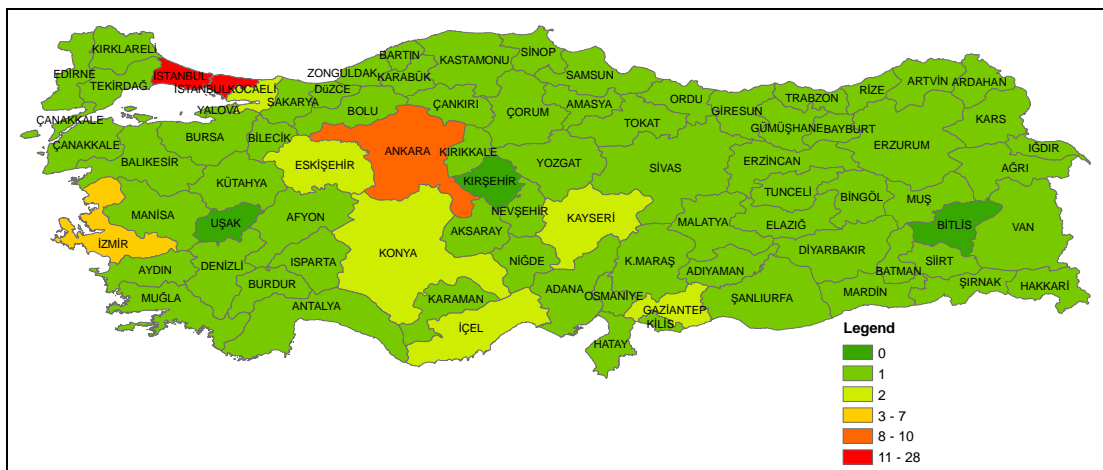
Figure 5.25   Number of Universities by NUTS 3 Regions, 2008

Share of University Graduates

Parallel to increase in the number of university, share of university graduates significantly changed. Other then three metropolitan areas (İstanbul, Ankara, İzmir), NUTS 3 regions at Mediterranean, Aegean and Marmara region had relatively high share of university graduates in 1985 (Figure 5.26). This picture has significantly changed since 1985, share of university graduates as of 2008 is homogenously distributed among NUTS 3 regions (Figure 5.27) but NUTS 3 regions at South East and East Anatolia have still very low shares. This change can be interpreted as a result of number of universities and socio economic facilities in the region that attract or university graduated person.
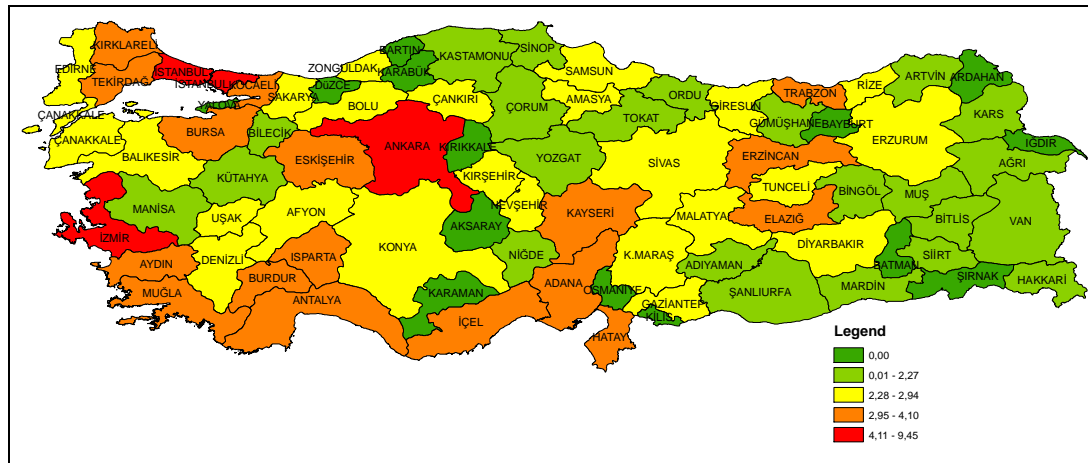
Figure 5.26   Share of University Graduates by NUTS 3 Regions, 1985

Number of Thesis

Number of produced thesis at universities always tended to increase. While number of annually approved thesis at national level was 234 in 1980, it was dramatically increased and reached to 11 968 in 2008. Similarly, the number of thesis per million population in Turkey has significantly increased (Figure 5.27).
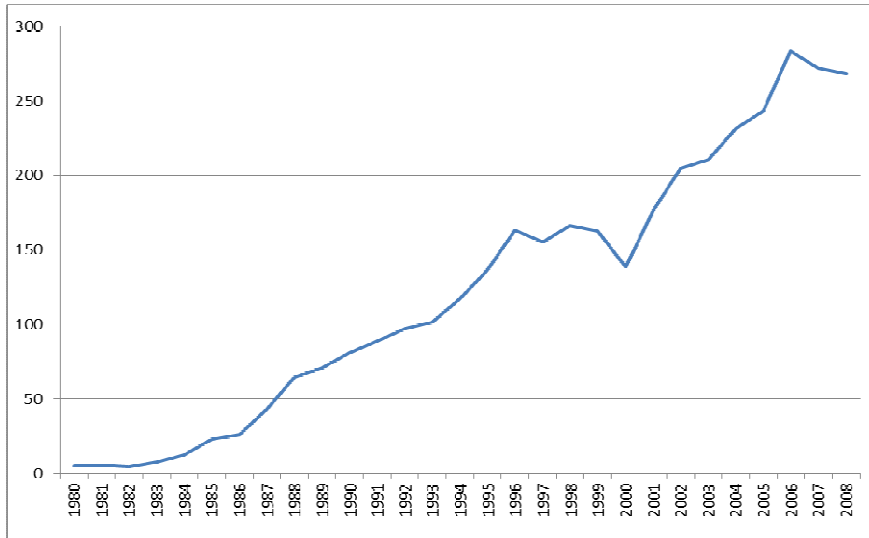
Figure 5.27   Changes in the Number of Thesis per Million Population in Turkey, 1980-2008

Produced thesis is also increased in all NUTS 3 regions, but geographical distribution of the produced thesis has not significantly changed since 1980. Most of the theses are produced at Ankara, İstanbul and İzmir (Figure 5.28 and 5.29).
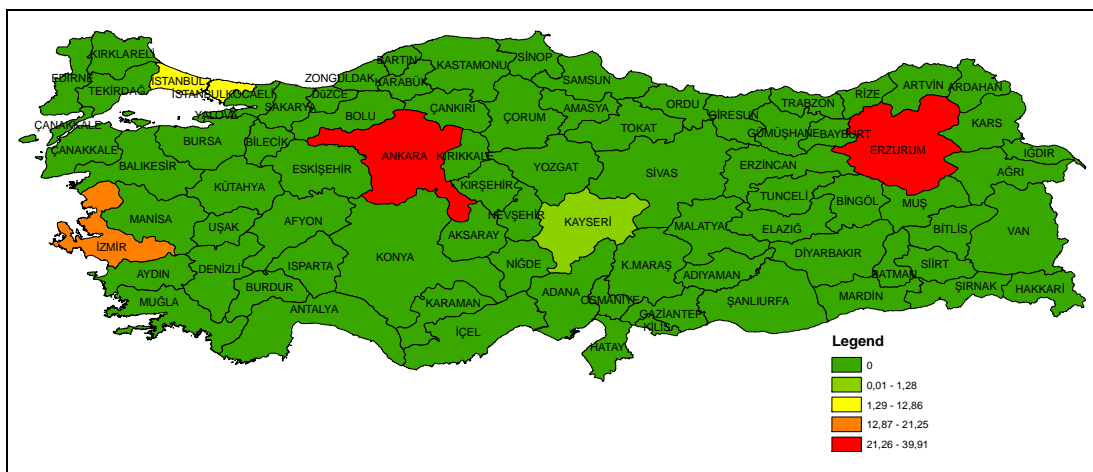
Figure 5.28   Number of Thesis per Million Population by NUTS 3 Regions, 1980
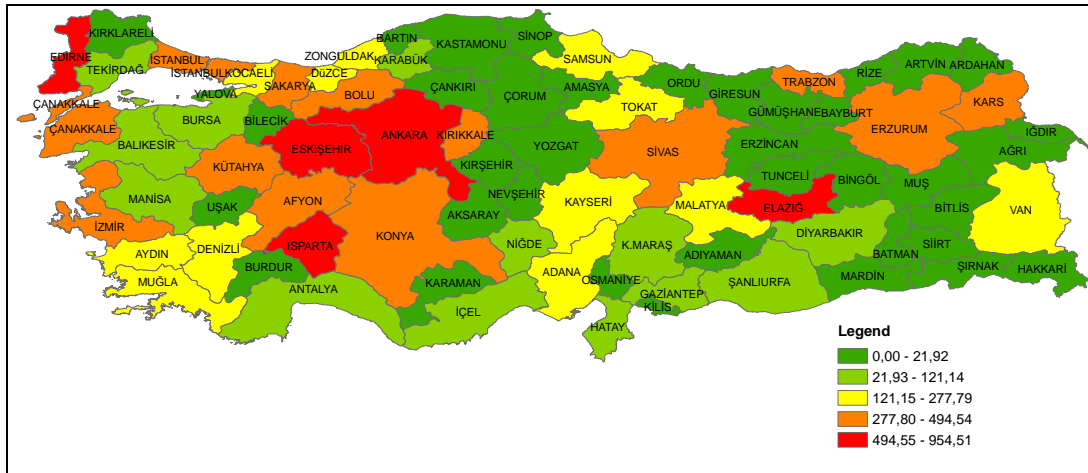
Figure 5.29   Number of Thesis per Million Population by NUTS 3 Regions, 2008

Number of Established Foundations

In Turkey, while the number of foundations was 598 in 1980, it showed a rapid development and reached to 4 407 in 2008. This development process can be divided into three phases.

- 1980-1985 slow growth period,
- 1986-2001 rapid development period,
- 2002-2008 stagnation period.

Encouraging legal regulations and encouraging policies of the state increased the number of foundations and after 2001 it reached to saturation point
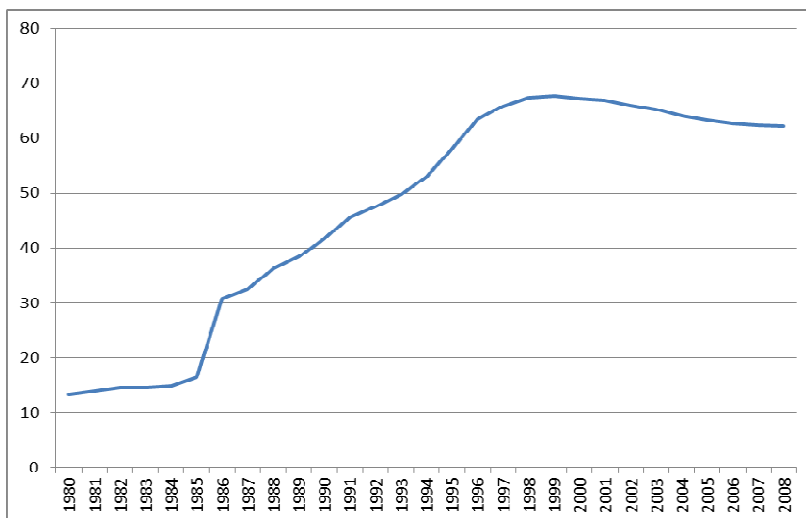
Figure 5.30   Changes in Foundations per Million Population on Nationwide, 1980-2010

Foundations per million population showed similar development trend, but the stagnation period for the total number of foundations can be named as decline period in terms of foundations per million population as it started to decrease after 1999 (Figure 5.30).

The foundation per million population in 1980 by NUTS 3 regions increase gradually from east to west (Figure 5.31). Regional distribution of foundations per million population as of 2008 is given in Figure 5.32. As can been seen from the figure regions with the highest per-capita foundation are Istanbul, Ankara and Izmir. This three regions have 51.22% of total foundations. The regions with the lowest foundation per inhabitant are located within the Iğdır – Mersin - Hakkari triangle (excluding Kilis).
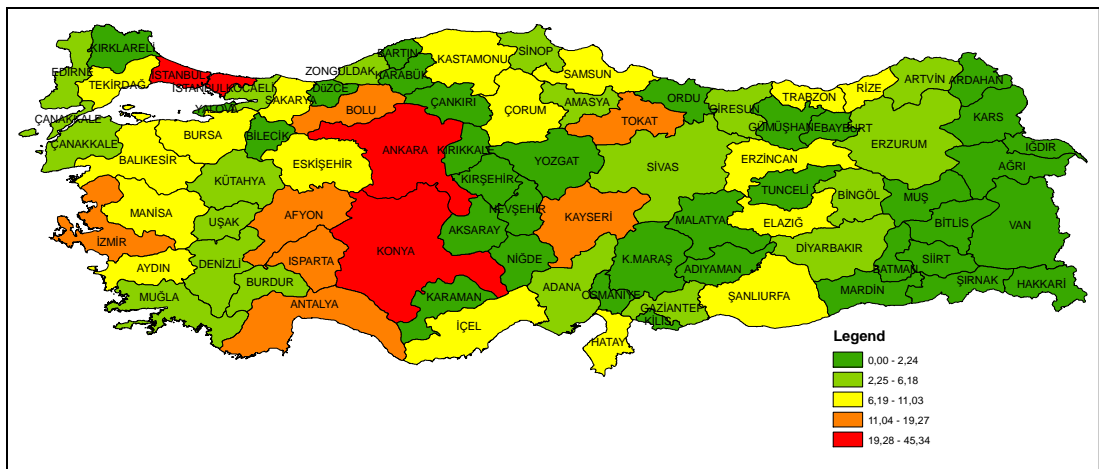
Figure 5.31   Foundations per Million Population by NUTS 3 Regions, 1980
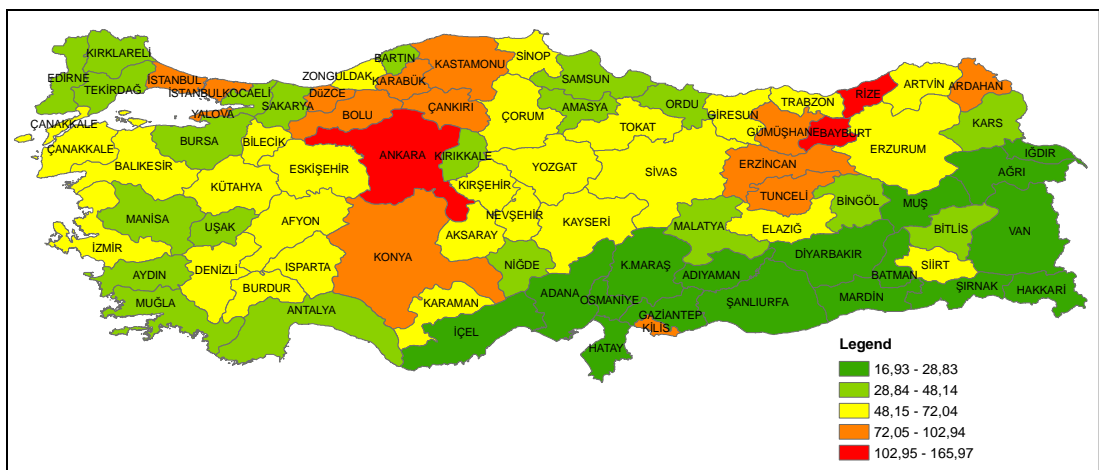
Figure 5.32   Foundations per Million Population by NUTS 3 Regions, 2008

5.6 Agglomeration and Specialization

Agglomeration

Herfindahl concentration index which is calculated based on regional GDP data for industry subsectors (mining, manufacturing and electricity, gas and water) is used to measure agglomeration on a specific sector.
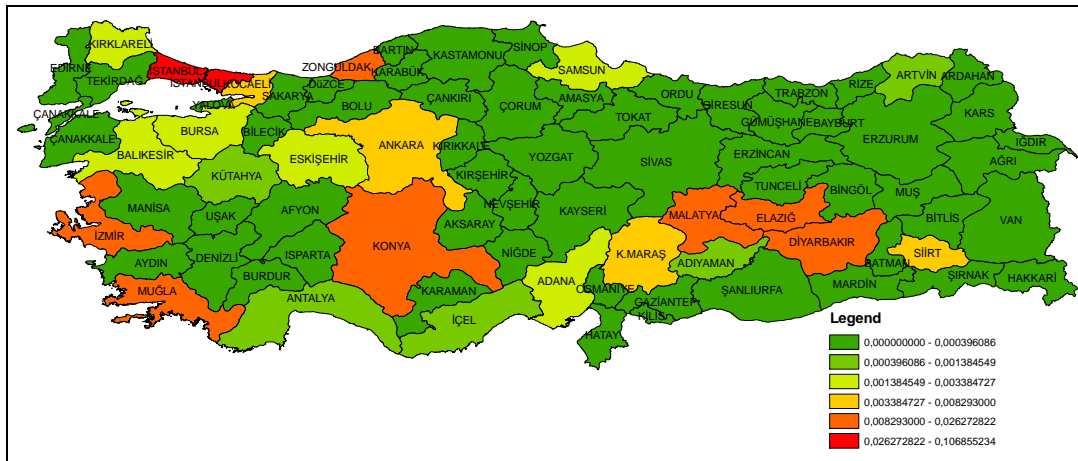
Figure 5.33   Herfindahl Concentration Index by NUTS 3 Regions, 1987

Herfindahl concentration index measures the agglomeration among the nation. Higher index value indicates agglomeration of one or more sub-sectors in the region. Herfindahl concentration index for 1987 by NUTS 3 regions shows that NUTS 3 regions at Marmara, Aegean, Central Anatolia and Southern part of East Anatolia have higher agglomeration (Figure 5.33).

Specialization

Herfindahl specialization index which is calculated based on regional GDP data for industry subsectors (mining, manufacturing and electricity, gas and water) is used to measure specialization. Herfindahl specialization index measures the specialization of a region on a sub-sector. Higher index value indicates specialization on one or more sub-sectors. Geographical representation of 1987 Herfindahl specialization index data by NUTS 3 regions shows gradually decreasing pattern from west to east in Turkey (Figure 5.34).
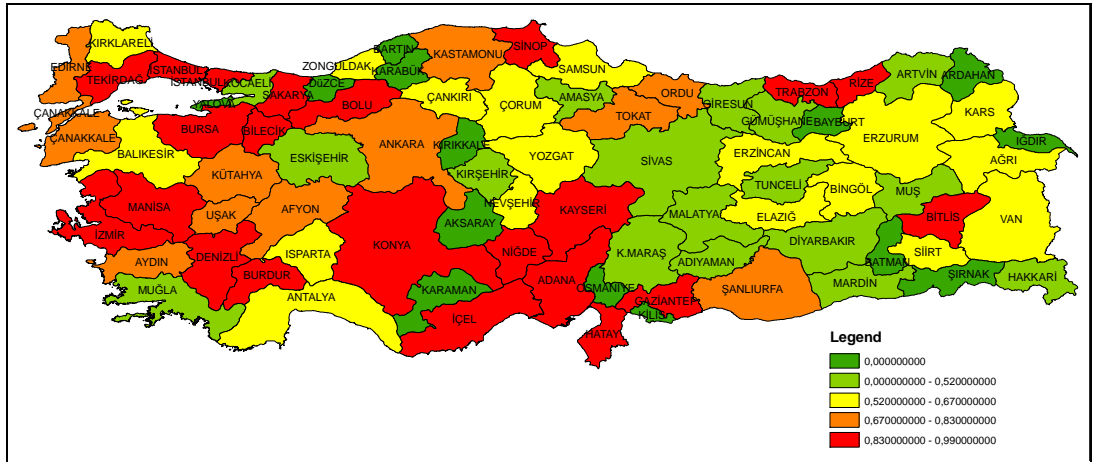
Figure 5.34   Herfindahl Specialization Index by NUTS 3 Regions, 1987

CHAPTER 6

DRIVERS OF REGIONAL GROWTH: MODEL AND EMPIRICAL FINDINGS

6.1 Introduction

Recent theoretical frameworks represent consensus on factors of regional development: local assets, capacities, dynamics, knowledge, learning and innovation. A great deal of research has been made to provide evidence on effect of factors especially emphasized by recent theories to growth. These researches focus on a single growth factor and economically advanced and innovative regions. Therefore, there are huge empirical studies on growth factors, but success of theories and success of proposed factors have not comprehensively discussed yet.

The objective of this Chapter is to assess effect of both endogenous and exogenous factors emphasized by various theoretical frameworks on regional growth. These theoretical considerations and empirical studies, which have already been discussed in Chapter Two in detail, provide the necessary conceptual frame to this Chapter.

Within this context, this chapter appraises the effect of endogenous and exogenous factors and evaluates the growth theories in terms of explaining the growth in Turkish regions. Geographical scope of the empirical study is defined as 81 NUTS 3 regions (provinces) of Turkey and study period, as mentioned in Chapter four, is defined by considering historical progress of regional development policies implemented in Turkey. Analyze period is defined as 1980-2008. This period also divided into two sub periods which are 1980-2000 and 2000-2008.

This Chapter, depending on the econometric model, concentrates on five groups of theories:

- Theories emphasizing market dynamics,

- Theories emphasizing the role of government,

- Theories emphasizing territorial external factors,

- Theories emphasizing new production system and spaces,

- Innovation based territorial models.

6.2 Empirical Model

Ordinary least squares (OLS) estimates are the best linear unbiased estimates. The use of OLS estimation allows employing a battery of powerful diagnostic tests to evaluate the data coherence of our model specification. In addition, the properties of OLS estimation will prove

useful when evaluating the relative explanatory significance of our competing models of local economic performance (Amemiya, 1985).

On the basis of theoretical information summarized in Table 4.2, five groups of theories can be nested within an over parameterized model:

$$ln(GDPPCG) = \beta_0 + \beta_1 ln(IGDPPC) + \beta_2(ShLabFor) + \beta_3 ln(DepPC) + \beta_4 ln(TPubExp) +$$
$$\beta_5(TIncInvPC) + \beta_6(PRD) + \beta_7(HerfConc) + \beta_8(NThPC) +$$
$$\beta_9(NOIZPI) + \beta_{10}(HerfSpec) + \beta_{11}(EstFounPC) + \beta_{12}(ShUniGr) +$$
$$\beta_{13}(NUniv) + \varepsilon$$

where βs are the coefficients or parameters to be estimated, ε is a stochastic error term.

Table 6.1   Growth Drivers and Proxies Used in the Study

Growth Factor	Proxy	Abbreviation
Growth	GDP per capita growth	GDPPCG
Initial condition	Initial GDP per capita	IGDPPC
Production factor labor	Share of labor force in total population	ShLabFor
Capital and saving	Bank deposit per capita	DepPC
Public Expenditure	Total public expenditure per capita	TPubExp
Government incentive	Incentive fixed investment per capita	TIncInvPC
Government intervention	Being within the scope of priority regions in development	PRD
Agglomeration on a specific sector	Herfindahl concentration index	HerfConc
Accumulation of knowledge	Thesis per million population	NThPC
Jointly used infrastructure	Number of OIZ plot	NOIZPI
Specialization	Herfindahl specialization index	HerfSpec
Trust	Established new foundations per million population	EstFounPC
Skilled human capital	Share of university graduate	ShUniGr
Innovation/ R&D capacity	Number of universities	NUniv

In Chapter five, growth performance of NUTS 3 regions of Turkey between 1980-2008 period and the general characteristics of these factors have been scrutinized in order to provide necessary background for this chapter.

Potential problems related with data and model construction, developed methods for the solution of these problems and the methods used in the study to overcome possible problems are explained in Chapter Four. Rementioning briefly, methods used in the study to overcome possible problems will be helpful, while explaining empirical results.

Significance levels of the variables and the coefficient values are checked to overcome possible inclusion of irrelevant or extraneous variable problem. F test (a kind of Wald test) is employed to overcome omitting a relevant explanatory variable problem. RESET test is used to solve possible functional form misspecification problem. To overcome multicollinearity problem in the study correlation matrix is used. Correlation matrixes are given in Appendix B. Independent variables highly correlated with other independent variables are omitted. Wherever possible, in the study, variables are measured at their initial levels in order to limit the potential endogeneity of some explanatory variables.

6.3   Empirical Findings

Turkey experienced significant changes, parallel to the economic policy, in the regional policy arena in 1980s and in 2000s. Turkey left state dominated Turkish economic policy, limited the activities of public sector and adopted market mechanism.

Implementation of neo-liberal policies in 1980s also caused to transformation in the arena of regional policy; increasing emphasis on local economic development, local conditions, and local entrepreneurship. These emphasizes are consistent with the theories of the era. Although direct state investments are lost their significance, state support and supporting private sector in underdeveloped regions were emphasized in this period.

Turkey gained candidate status for the European Union in 1999 led to step up efforts for integration with the European Union which attaches great importance to reduction of regional disparities. Besides, 2001 crisis that Turkey experienced meant the bankruptcy of economic policies implemented in the previous period, and pointed out the need of significant policy change. Therefore after 2001, significant changes occurred in regional policy which is developed in cohesion with EU regional policies. These changes, in fact, were result of former transformations. In this context; emphasis were placed on activities towards increasing the consistency and effectiveness of policies at the central level, creating a development environment based on local dynamics and internal potentials, institutional capacity at the local level.

In order to investigate the effects of factors on growth, three general unrestricted models (GUM) are formulated and run for these three periods: one is for whole period starting with the Implementation of neo-liberal policies (1980-2008); two are for sub periods (1980-2000 and 2000-2008).

6.3.1   Main Findings for 1980-2008 Period

Thirteen variables, as mentioned above, are used in the model. Before interpreting the results of the model, briefly analyzing relationship between the independent variables will help while interpreting the results. Correlation matrix of variables used in the 1980-2008 model is given in Appendix B. Correlation matrix is also used during model construction to detect and solve multicollinearity problem. If correlation coefficient is 0.8 (absolute value) or higher among the independent variables, independent variable is replaced to solve multicollinearity problem. As can be seen from the Appendix B, there is no correlation among independent variables higher than 0.8.

The correlation matrix of independent variables (1980-2008 model) shows that there is correlation between initial GDP per capita and bank deposit per capita, being within the scope of priority regions in development and share of university graduate. While sign for the relation between initial GDP per capita and bank deposit per capita and share of university graduate is positive, there is negative correlation between initial GDP per capita and being within the scope of priority regions in development. This shows that those regions with higher levels of initial GDP PC have, as expected, higher bank deposit per capita and Share of university graduate. The negative correlation between initial GDP per capita and being within the scope of priority regions in development shows that PRDs are selected among low GDP PC regions. On the other hand, initial GDP per capita does not have statistically strong correlation with total public expenditure per capita or with incentive fixed investment per capita. But positive sign between initial GDP per capita and total public expenditure per capita shows that those regions with higher levels of initial GDP PC received higher public expenditure per capita and obtained more Incentive. This is significant to interpret the model results and Turkish regional policies. Similarly, there is significant correlation between TPubExp and PRD, but interestingly sign of the relation is negative which means PRD received less TPubExp.

From the annualized GDP per capita growth rate relativities for 1980 and 2008, the general model specification is shown in Table 6.2. In the general model specification, the set of explanatory variables accounts for 54.3% of the variability in GDP per capita growth relativities. A computed F (13,53) 4.82 [0.000] provides strong evidence in favor of the hypothesis that this set of predictor variables accounts for a statistically significant amount of the variability in this model.

From the set of regionally specific thirteen variables, four; IGDPPC, ShLabFor, DepPC, TIncInvPC, are statistically significant.

Those regions with higher levels of demand as measured by initial GDP per capita, IGDPPC, have lower estimated GDP per capita growth which is consistent with convergence hypothesis. Similarly, those regions with a better production factor labor as measured by share of labor force in population, ShLabFor, have higher estimated GDP per capita growth.

More controversially, those regions with higher levels of capital and saving as measured by bank deposit per capita, DepPC, are predicted to have higher GDP per capita growth. Although there is significant and positive correlation between IGDPPC and DepPC, their effect on GDP per capita growth is different side. While IGDPPC negatively affects GDPPCG, DepPC positively affects GDP per capita growth.

Similarly those regions with higher government incentive as measured by Incentive fixed investment per capita, TIncInvPC, are estimated to have higher GDP per capita growth.

Thus, although capital and saving, government incentive and labor force appear to generate GDP in the Turkish context; initial GDP per capita is counterproductive.

Table 6.2   General Model Specification, 1980-2008 (Full Data)

	Coefficient	Std. Error	t-value	t-prob	Part.R^2
Constant	9.69943	2.039	4.76	0.0000	0.2991
IGDPPC	-0.889330	0.1666	-5.34	0.0000	0.3498
ShLabFor	3.95957	1.070	3.70	0.0005	0.2053
DepPC	0.308485	0.1006	3.07	0.0034	0.1507
TPubExp	0.0516842	0.04815	1.07	0.2879	0.0213
TIncInvPC	0.0990507	0.04318	2.29	0.0258	0.0903
PRD	-0.0134769	0.1222	-0.110	0.9126	0.0002
HerfConc	1.30495	4.097	0.319	0.7513	0.0019
NThPC	-0.00238049	0.008176	-0.291	0.7721	0.0016
NOIZPI	0.000702217	0.001041	0.675	0.5028	0.0085
HerfSpec	-0.220700	0.2955	-0.747	0.4584	0.0104
EstFounPC	0.00539197	0.008957	0.602	0.5498	0.0068
ShUniGr	-0.0477631	0.07976	-0.599	0.5518	0.0067
NUniv	0.177102	0.1133	1.56	0.1241	0.0440

R^2 0.54341   F(13,53) =4.852   [0.000]**

Normality test: Chi^2 (2) = 37.292[0.0000]**
Hetero test: F(25,41) = 1.4988[0.1225]
RESET23 test: F(2,51) = 1.7600[0.1823]
R^2 relative amount of variance of the dependent variable explained by the explanatory variables
Hetero test tests if the errors have constant variances against the alternative that the squared errors depend on the original and squared repressors. The null hypothesis is no heteroscedasticity.
RESET denotes the Ramsey functional form misspecification test. The null hypothesis is no functional form misspecification.
[...] Probabilities.
* denotes significances at the 5% level.
** denotes significances at the 1% level.

The remaining variables are not individually significant. It is surprising that the variable intended to capture the effect of public expenditure as measured by total public expenditure per capita, TPubExp, is not statistically significant. Reinforcing this view of government intervention is the negative but again statistically insignificant stimulus to regional GDP per capita growth provided government intervention as measured by being within the scope of priority regions in development (PRD).

Accumulation of knowledge as measured by thesis per million population (NThPC), which is also highly emphasized by recent soft models, is also not individually statistically significant. But present analysis suggests that accumulation of knowledge does have a sign consistent with expectations.

Jointly used infrastructure (measured by number of OIZ plot) which is emphasized by flexible production theory, new industrial district and cluster and partially by growth pole is also not individually statistically significant in the present analysis but though it has positive sign as consistent with expectations.

In present analysis; agglomeration on a specific sector as measured by Herfindahl concentration index and specialization as measured by Herfindahl specialization index are also not individually statistically significant. But they have negative sign contrary to theoretical expectations of growth pole, cluster and industrial district theories. In other words those regions with higher levels of agglomeration on a specific sector and specialization on a specific sector have lower estimated GDP per capita growth.

Above result is also validated by specific model. Specific model specifications are given in Table 6.3. Specific model adds innovation capacity, a key element in recent theoretical models of regional growth, as measured by number of university (NUniv). According to specific model, in Turkish context, innovation capacity has positive effect on GDP per capita growth. This is consistent with the recent theoretical expectations.

Table 6.3   Specific Model Specification, 1980-2008 (Full Data)

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
Constant	9.32113	1.650	5.65	0.0000	0.3435
IGDPPC	-0.841671	0.1384	-6.08	0.0000	0.3774
ShLabFor	3.75948	0.9363	4.02	0.0002	0.2090
DepPC	0.272107	0.08925	3.05	0.0034	0.1322
TIncInvPC	0.0827838	0.03930	2.11	0.0393	0.0678
NUniv	0.166558	0.07931	2.10	0.0399	0.0674

R^2 0.503543 $F(5,61) = 12.37 [0.000]^{**}$

Normality test: $Chi^2(2) = 35.473$ $[0.0000]^{**}$
Hetero test: $F(10,56) = 2.1731$ $[0.0331]^*$
Hetero-X test: $F(20,46) = 2.8006$ $[0.0020]^{**}$
RESET23 test: $F(2,59) = 2.0973$ $[0.1319]$
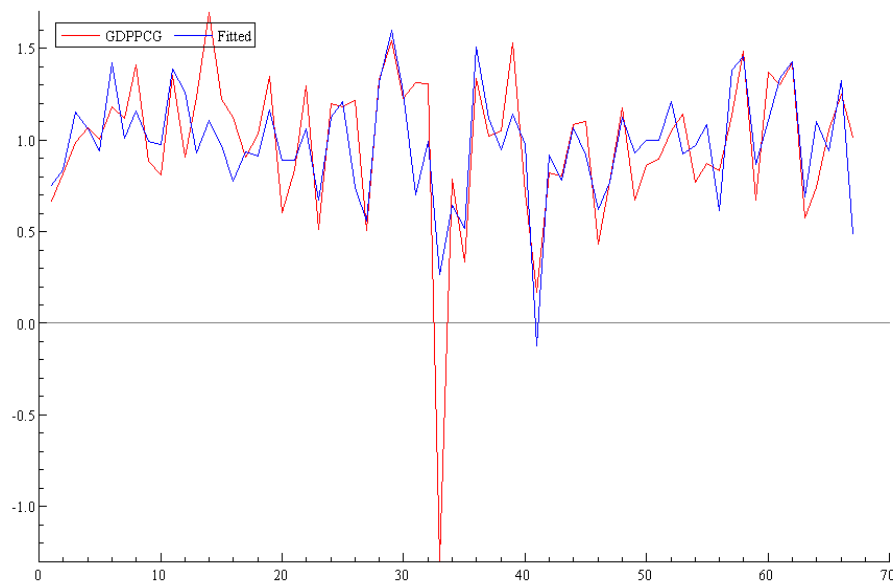
Figure 6.1   Explanatory Power of the Specific Model, 1980 –2008 (Full Data)

As a result, according to the results of the 1980-2008 model, GDP per capita growth is determined by government incentives, in addition to the endogenous factors. This result shows that in addition to the factors emphasized by recent theories, government interventions are still significant for regional growth in Turkish context.

As mentioned above the interpretation and significance both of the parameter estimates and of the overall model are only meaningful if the specification satisfies the assumptions underlying OLS estimation. On the basis of tests, it can be concluded that is no evidence in the sample to suggest that the disturbance term is spatially autocorrelated or has nonconstant variance (heteroscedasticity), or has functional form misspecification. But, normality test indicate nonnormality. However, test of normality in the disturbance term does indicate the presence of nonnormality at the 1% significance level. Nonnormality may be result of outliers. An outlying value is defined as a residual that lays 1.5 x interquartile range of the distribution of residual variation (Erickson and Nosanchuk, 1992; Hamilton, 1992). In this instance, the box plot of residuals identifies a residual that is potential outlier. Figure 6.2, box plot of GDP per capita growth, visualize outlier region, outlier value can also be observed from Figure 6.1.
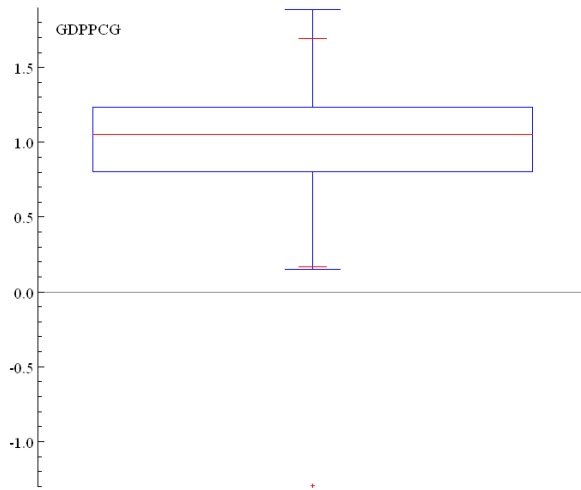
Figure 6.2   Box Plot of GDP per Capita Growth (Logarithmic Values), 1980-2008

However, only one region, Mersin, has residual value that lies well beyond the whisker. Specifically, the general model significantly under predicts GDP per capita growth relativities for Mersin (Figure 6.2).

In order to correct the nonnormal disturbance in the general model (Table 6.2) the outlying observation is removed. General model specification for 1980-2008 period (outliers excluded) is given in Table 6.4.

Table 6.4   General Model Specification, 1980-2008 (Outliers Excluded)

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
Constant	7.56374	1.528	4.95	0.0000	0.3204
IGDPPC	-0.688304	0.1256	-5.48	0.0000	0.3660
ShLabFor	3.38494	0.7892	4.29	0.0001	0.2613
DepPC	0.218161	0.07494	2.91	0.0053	0.1401
TPubExp	0.0324097	0.03541	0.915	0.3643	0.0159
TIncInvPC	0.0800320	0.03179	2.52	0.0149	0.1087
PRD	-0.0133716	0.08960	-0.149	0.8819	0.0004
HerfConc	-0.579449	3.016	-0.192	0.8484	0.0007
NThPC	-0.00397702	0.006000	-0.663	0.5103	0.0084
NOIZPI	0.000510466	0.0007636	0.668	0.5068	0.0085
HerfSpec	-0.0803602	0.2176	-0.369	0.7134	0.0026
EstFounPC	0.00439274	0.006569	0.669	0.5067	0.0085
ShUniGr	0.0163379	0.05923	0.276	0.7838	0.0015
NUniv	0.0877941	0.08413	1.04	0.3015	0.0205
R^2	0.556921	F(13,52)	=	5.028	[0.000]**

Normality test: Chi^2(2) = 3.3798   [0.1845]
Hetero test: F(25,40) = 2.2009   [0.0126]*
RESET23 test: F(2,50) = 0.099250   [0.9057]

In the general model specification, the set of explanatory variables accounts for 55.7 % of the variability in GDP per capita growth relativities. A computed $F(13,52)$ 5.03 [0.000] provides strong evidence in favor of the hypothesis that this set of predictor variables accounts for a statistically significant amount of the variability in this model. Besides the normality test does not indicate nonnormality.

Removing outlier value from the database does not make significant changes in terms of statistically significant variables and coefficients. Like full model, outlier removed model highlights, four variables; IGDPPC, ShLabFor, DepPC, TIncInvPC among thirteen variables

Above result is also validated by specific model. Specific model specifications are given in Table 6.5. Specific model adds innovation capacity, a key element in recent theoretical models of regional growth, as measured by number of university (NUniv). According to specific model, in Turkish context, innovation capacity has positive effect on GDP per capita growth. This is consistent with recent theoretical expectations.

Table 6.5   Specific Model Specification, 1980-2008 (Outliers Excluded)

	Coefficient	**Std.Error**	**t-value**	**t-prob**	**Part.R^2**
Constant	7.33413	1.247	5.88	0.0000	0.3619
IGDPPC	-0.643910	0.1061	-6.07	0.0000	0.3766
ShLabFor	2.39409	0.5439	4.40	0.0000	0.2410
DepPC	0.270536	0.05944	4.55	0.0000	0.2535
TIncInvPC	0.0703445	0.02910	2.42	0.0187	0.0874

R^2 0.500361 $F(4,61) = 15.27$ [0.000]**

Normality test: $Chi^2(2)$ = 1.2086   [0.5465]
Hetero test: $F(8,57)$ = 0.78655   [0.6164]
Hetero-X test: $F(14,51)$ = 1.8852   [0.0508]
RESET23 test: $F(2,59)$ = 0.020400   [0.9798]
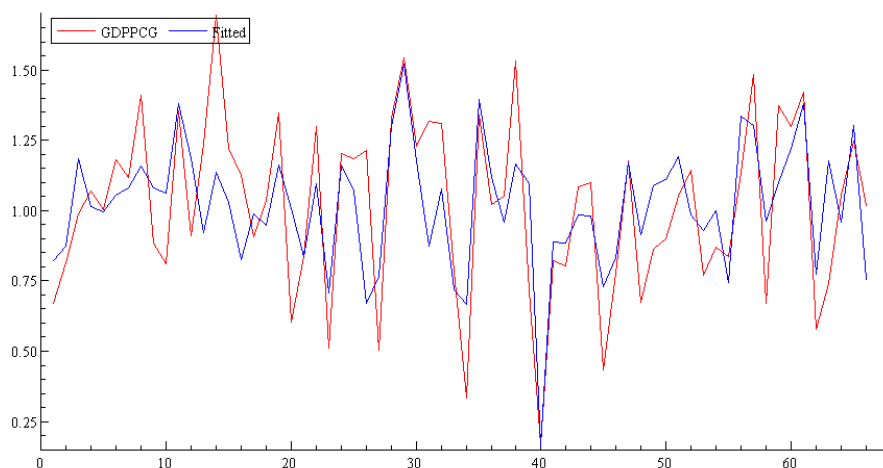
Figure 6.3   Explanatory Power of the Specific Model, 1980 –2008 (Outliers Excluded)

6.3.2 Main Findings for 1980-2000 Period

Dependent variable in 1980-2000 model is GDP per capita growth between 1980 and 2000. Base year of independent variables are mainly 1980 like 1980 – 2008 model. In other words, the only difference between 1980-2008 model and 1980-2000 model is the GDP per capita growth data. Therefore correlation matrix of independent variables used in the 1980-2000 model is same with the correlation matrix of independent variables used in the 1980-2008 model. Interpretation of correlation matrix is of 1980-2008 model is also valid for 1980-2000 model.

From the annualized GDP per capita growth rate relativities for 1980 and 2000, the general model specification is shown in Table 6.6. In the general model specification, the set of explanatory variables accounts for 40.0 % of the variability in GDP per capita growth relativities. A computed $F(13,50) = 2.572$ [0.008] provides strong evidence in favor of the hypothesis that this set of predictor variables accounts for a statistically significant amount of the variability in this model.

On the basis of tests, it can be concluded that there is no evidence in the sample to suggest that the disturbance term is spatially auto correlated or has nonconstant variance (heteroscedasticity), or has functional form misspecification. Besides the normality test does not indicate nonnormality. Therefore, results of the model are meaningful.

Table 6.6   General Model Specification, 1980-2000 (Full Data)

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
Constant	3.60593	3.176	1.14	0.2617	0.0251
IGDPPC	-0.614617	0.2606	-2.36	0.0223	0.1001
ShLabFor	3.16540	1.632	1.94	0.0580	0.0700
DepPC	0.539034	0.1599	3.37	0.0015	0.1851
TPubExp	0.177347	0.07304	2.43	0.0188	0.1055
TIncInvPC	0.0963757	0.06535	1.47	0.1465	0.0417
PRD	0.206504	0.1850	1.12	0.2697	0.0243
HerfConc	-5.24304	6.207	-0.845	0.4023	0.0141
NThPC	-0.0257294	0.01235	-2.08	0.0424	0.0798
NOIZPI	-0.000363418	0.001573	-0.231	0.8183	0.0011
HerfSpec	0.632938	0.4501	1.41	0.1658	0.0381
EstFounPC	-0.00280171	0.01354	-0.207	0.8369	0.0009
ShUniGr	-0.0517987	0.1239	-0.418	0.6777	0.0035
NUniv	0.263919	0.1730	1.53	0.1334	0.0445

R^2 0.400694 $F(13,50)$ =   2.572   [0.008]**
Normality   test: $Chi^2(2)$ =   5.4775   [0.0646]
Hetero   test: $F(25,38)$ =   0.73658 [0.7874]
RESET23   test: $F(2,48)$ =   1.2091   [0.3074]

From the set of regionally specific thirteen variables, five variables; IGDPPC, ShLabFor, DepPC, TPubExp, and NThPC, are statistically significant. While IGDPPC and NThPC have negative contribution to GDP per capita growth; ShLabFor, DepPC and TPubExp are positive effect on GDP per capita growth.

Those regions with higher initial GDP per capita, IGDPPC, have lower estimated GDP per capita growth. This result is consistent with the results of 1980-2008 model, and with the convergence hypothesis. Accumulation of knowledge as measured by thesis per million population (NThPC), which is highly emphasized by recent soft models, is also statistically significant and suggests in the present model that accumulation of knowledge does have a negative sign which is not consistent with recent theoretical expectations.

More controversially and significantly, those regions with higher levels of capital and saving as measured by bank deposit per capita, DepPC, are predicted to have higher GDP per capita growth. Similarly those regions with higher public investments as measured by public expenditure per capita, TPubExp, are estimated to have higher GDP per capita growth. This result is significant to illustrate the effect of public expenditures to regional growth.

The remaining variables are not individually significant, but in order to reinforce the view of government intervention has positive effect on regional growth, exogenous interventions as measured by incentive fixed investment per capita and government intervention as measured by being within the scope of priority regions in development (PRD) can be added to this rendering. Incentive fixed investment per capita is not statistically significant but represent positive effect on growth in Turkey. PRD, unlike 1980-2008 model, represent positive but again statistically insignificant stimulus to regional GDP per capita growth provided.

Adding to this interpretation, higher levels of innovation/ R&D capacity as measured by number of universities, NUniv, a key element in recent theoretical models of regional growth, is also not individually statistically significant in the present analysis, though it does have a sign consistent with expectations. This is a particularly important finding in relation to the role of innovation/ R&D capacity in regional growth processes.

Jointly used infrastructure (measured by number of OIZ plot) is also not individually statistically significant in the present analysis but though it has positive sign which is consistent with theoretical expectations. In present analysis, specialization which is emphasized by flexible production theory, new industrial district theory and cluster theory is also not individually statistically significant. But it has positive sign as consistent with expectations. In other words those regions with higher levels of specialization on a specific sector have higher estimated GDP per capita growth.

Contrary to the 1980-2008 model, in 1980-2000 model, trust as measured by of established foundations per million population, EstFounPC, has negative effect on GDP per capita growth.

To sum up, the results of the 1980-2000 model support findings of the 1980-2008 model. The result adds public expenditure in addition to the government incentives to the determinants of regional growth in Turkish context. Public expenditure like incentive has positive effect on growth.

When general model is reduced to specific model only three variables remained which are statistically significant (Table 6.7). These are initial GDP per capita (IGDPPC), bank deposit per capita (DepPC) and share of labor force in population (ShLabFor). While IGDPPC has negative contribution to GDP per capita growth; ShLabFor and DepPC are positive effect on GDP per capita growth.

Table 6.7   Specific Model Specification, 1980-2000 (Full Data)

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
IGDPPC	-0.156946	0.05588	-2.81	0.0067	0.1145
ShLabFor	3.25396	1.170	2.78	0.0072	0.1125
DepPC	0.260278	0.09738	2.67	0.0096	0.1048

Normality   test: $Chi^2(2)$ =   7.3326   [0.0256]*
Hetero   test: $F(6,57)$ =   1.2214   [0.3089]
Hetero-X   test: $F(9,54)$ =   1.3989   [0.2118]
RESET23   test: $F(2,59)$ =   0.16893   [0.8450]

Figure 6.4 illustrates explanatory power of the specific model, 1980 –2000 (full data). Figure 6.5 shows box plot of GDP per capita growth for 1980-2000 period, as can be observed from the figure there is no outlier for this data.
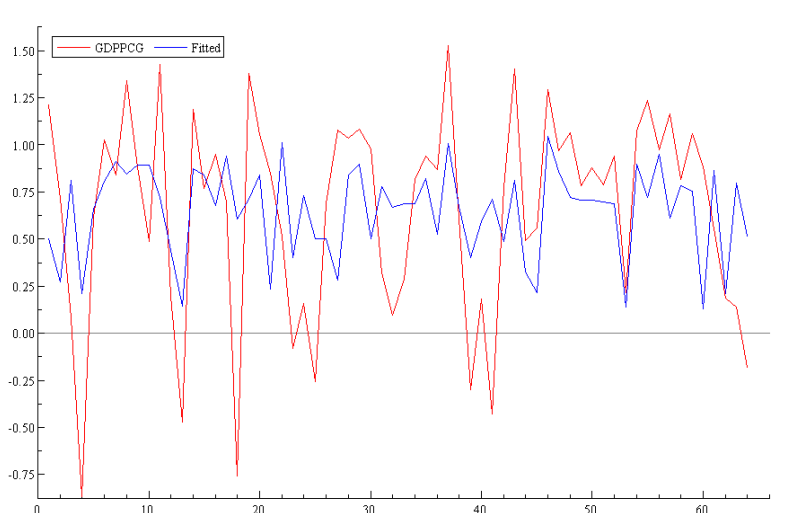
Figure 6.4   Explanatory Power of the Specific Model, 1980 –2000 (Full Data)
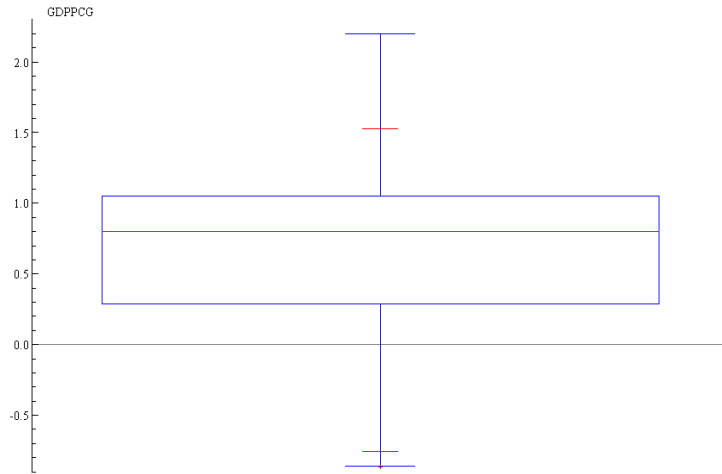
Figure 6.5   Box Plot of GDP per Capita Growth (Logarithmic Values), 1980-2000

6.3.3   Main Findings for 2000-2008 Period

Correlation matrix of variables used in the 2000-2008 model is given in Appendix B, Table B.3. Correlation matrix is used during model construction to detect and solve multicollinearity problem. If correlation coefficient is 0.8 (absolute value) or higher among the independent variables, independent variable is replaced to solve multicollinearity problem. As can be seen from the Appendix B Table B.3, there is high correlation (higher than 0.8) between number of university used to measure innovation capacity and Herfindahl concentration index used to measure concentration of sectors among nationwide. Number of university is also highly correlated with number of OIZ plot (used to measure level of jointly used infrastructure) and share of university graduate (used to measure skilled human capital). Therefore the independent variable, number of university, is omitted while running the 2000-2008 model.

The correlation matrix of independent variables of 2000-2008 model shows similar correlation pattern with the correlation matrix of independent variables of 1980-2008 model. There is correlation between initial GDP per capita and bank deposit per capita, being within the scope of priority regions in development and share of university graduate. While sign for the relation between initial GDP per capita and bank deposit per capita and share of university graduate is positive, there is negative correlation between initial GDP per capita and being within the scope of Priority Regions in Development. This shows that those regions with higher levels of initial GDP per capita have, as expected, higher bank deposit per capita and higher share of university graduate. The negative correlation between initial GDP per capita and being within the scope of Priority Regions in Development proves that PRDs are selected among low GDP per capita regions.

On the other hand, initial GDP per capita does not have statistically strong positive correlation with total public expenditure per capita or with incentive fixed investment per capita. But, positive sign shows that those regions with higher levels of initial GDP per capita received higher public expenditure per capita and obtained more incentive. This is significant to interpret the model results and Turkish regional policies.

Similarly, there is no statistically significant correlation between public expenditure per capita and being within the scope of Priority Regions in Development, but sign of the relation, like 1980-2008 period, is negative which means regions in PRD received less public expenditure per capita.

From the annualized GDP per capita growth rate relativities for 2000 and 2008, the general model specification is shown in Table 6.8. In the general model specification, the set of explanatory variables accounts for 48.8 % of the variability in GDP per capita growth relativities. A computed F(12,6) =4.763 [0.000] provides strong evidence in favor of the hypothesis that this set of predictor variables accounts for a statistically significant amount of the variability in this model.

From the set of thirteen variables only three; initial GDP per capita (IGDPPC), number of OIZ plot (NOIZPI) and Number of established new foundations (EstFounPC) are statistically significant. Those regions with higher levels of initial GDP per capita, IGDPPC, have lower estimated GDP per capita growth which is consistent with convergence hypothesis. Similarly, NOIZPI used to measure jointly used infrastructure has negative effect on growth, according to model. This is not consistent with territorial models emphasizing production and jointly used infrastructure. On the other hand, trust, as measured by established foundations per million population, EstFounPC, has positive effect on GDP per capita growth. In other words, those regions with higher trust level have higher GDP per capita growth.

Table 6.8   General Model Specification, 2000-2008 (Full Data)

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
Constant	12.6113	3.009	4.19	0.0001	0.2264
IGDPPC	-0.888379	0.2398	-3.70	0.0005	0.1861
ShLabFor	-1.41456	1.845	-0.767	0.4464	0.0097
DepPC	0.117972	0.2154	0.548	0.5860	0.0050
TPubExp	0.0477058	0.1138	0.419	0.6765	0.0029
TIncInvPC	-0.102375	0.08077	-1.27	0.2099	0.0261
PRD	0.171160	0.2194	0.780	0.4384	0.0100
HerfConc	4.16006	5.972	0.697	0.4888	0.0080
NThPC	0.00145310	0.0009355	1.55	0.1256	0.0387
NOIZPI	-0.000440556	0.0002247	-1.96	0.0546	0.0602
HerfSpec	0.420004	0.4624	0.908	0.3673	0.0136
EstFounPC	0.00967267	0.004212	2.30	0.0252	0.0808
ShUniGr	0.0215606	0.07534	0.286	0.7757	0.0014

R^2 0.487848   F(12,60) =   4.763   [0.000]**
Normality test: Chi^2(2)   = 5.7145   [0.0574]
Hetero test: F(23,49)   = 1.1870   [0.3001]
RESET23 test: F(2,58)   = 0.37596   [0.6883]

The remaining variables are not individually significant, but their sign is also significant to investigate result of the model. Production factor as measured by share of labor force in total population, government incentive as measured by incentive fixed investment per capita and jointly used infrastructure as measured by number of OIZ plot seem to affect GDP per capita growth negatively. On the other hand, capital and saving as measured by bank deposit per capita, public expenditure as measured by total public expenditure per capita, government intervention as measured by being within the scope of priority regions in development, agglomeration on a specific sector as measured by Herfindahl concentration index, accumulation of knowledge as measured by thesis per million population, specialization as measured by Herfindahl specialization index, skilled human capital as measured by share of university graduate, innovation/ R&D capacity as measured by number of universities have positive effect on regional GDP per capita growth in Turkey between 2000-2008.

When general model is reduced to specific model, again, only three variables remained which are statistically significant (Table 6.9), but specific model includes incentives (TIncInvPC) instead of jointly used infrastructures (NOIZPI). While IGDPPC and TIncInvPC

have negative contribution to GDP per capita growth; EstFounPC positively affect GDP per capita growth.

Table 6.9   Specific Model Specification, 2000-2008 (Full Data)

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
Constant	12.6539	1.796	7.05	0.0000	0.4185
IGDPPC	-0.821095	0.1334	-6.16	0.0000	0.3545
TIncInvPC	-0.0895678	0.07061	-1.27	0.2089	0.0228
EstFounPC	0.00658928	0.002697	2.44	0.0171	0.0796

R^2 0.426224 $F(3,69) = 17.09$ $[0.000]^{**}$
Normality test: $Chi^2(2) =$ 8.2787 $[0.0159]^*$
Hetero test: $F(6,66) =$ 1.5973 $[0.1619]$
Hetero-X test: $F(9,63) =$ 1.3220 $[0.2438]$
RESET23 test: $F(2,67) =$ 0.53302 $[0.5893]$
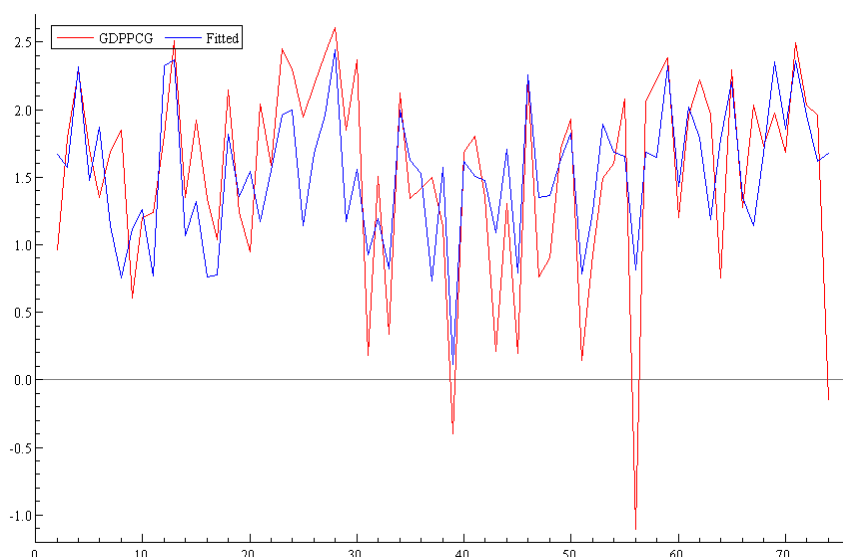
Figure 6.6   Explanatory Power of the Specific Model, 2000 –2008 (Full Data)

As mentioned above the interpretation and significance both of the parameter estimates and of the overall model are only meaningful if the specification satisfies the assumptions underlying OLS estimation. On the basis of tests, it can be concluded that is no evidence in the sample to suggest that the disturbance term is spatially auto correlated or has nonconstant variance (heteroscedasticity), or has functional form misspecification. But, test of normality in the disturbance term does indicate the presence of nonnormality at the 1% significance level. Nonnormality may be result of outliers. The box plot of GDP per capita growth (Figure 6.7) identifies three residuals that are potential outliers. The outlier regions are Tekirdağ, Kocaeli and Düzce.

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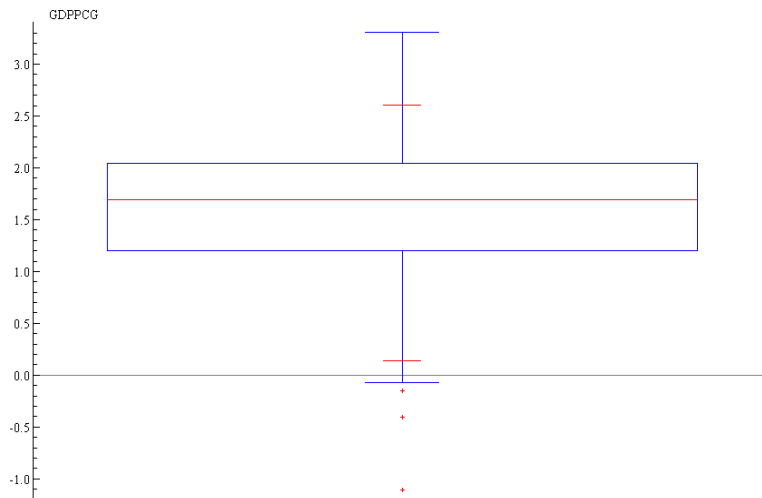
Figure 6.7   Box Plot of GDP per Capita Growth (Logarithmic Values), 2000-2008

In order to correct the nonnormal disturbance in the general model, the outlying observations are excluded. General model specification for 2000-2008 period (outlier excluded) is given in Table 6.10.

Table 6.10   General Model Specification, 2000-2008 (Outliers Excluded)

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
Constant	12.0340	2.581	4.66	0.0000	0.2761
IGDPPC	-0.828421	0.2068	-4.01	0.0002	0.2197
ShLabFor	0.276052	1.601	0.172	0.8637	0.0005
DepPC	0.0302184	0.1850	0.163	0.8708	0.0005
TPubExp	-0.00393298	0.09785	-0.0402	0.9681	0.0000
TIncInvPC	-0.0536667	0.06911	-0.777	0.4406	0.0105
PRD	0.0408350	0.1872	0.218	0.8281	0.0008
HerfConc	3.34262	5.048	0.662	0.5106	0.0076
NThPC	0.00115039	0.0007944	1.45	0.1531	0.0355
NOIZPI	-0.000348200	0.0001909	-1.82	0.0734	0.0551
HerfSpec	0.269921	0.4063	0.664	0.5091	0.0077
EstFounPC	0.00976541	0.003618	2.70	0.0091	0.1133
ShUniGr	0.0168766	0.06429	0.262	0.7939	0.0012

R^2 0.472977 $F(12,57) = 4.263$ [0.000]**
Normality test: $Chi^2(2) = 1.5788$ [0.4541]
Hetero test: $F(23,46) = 2.3563$ [0.0066]**
RESET23 test: $F(2,55) = 1.2739$ [0.2879]

The statistically significant factors of outliers excluded general model are same with the general model with full data. According to outliers excluded general model, initial GDP per

capita (IGDPPC), number of OIZ plot (NOIZPl) and established foundations per million population (EstFounPC), are statistically significant.

The remaining variables are not individually significant, but their sign is also significant to investigate result of the model. According to the model both public expenditure and incentive negatively affect the GDP per capita growth in Turkey between 2000-2008.

On the other hand, specific model of 2000-2008 (outlier removed) defines initial GDP per capita, deposit per capita and Herfindahl specialization index as statistically significant factors. This is somehow different from the factors that are founded statistically significant by general model.

Table 6.11   Specific Model Specification, 2000-2008 (Outliers Excluded)

	Coefficient	**Std.Error**	**t-value**	**t-prob**	**Part.R^2**
Constant	12.1114	1.957	6.19	0.0000	0.3673
IGDPPC	-0.836395	0.1768	-4.73	0.0000	0.2532
DepPC	0.164930	0.1146	1.44	0.1548	0.0304
HerfSpec	0.216424	0.3799	0.570	0.5708	0.0049

R^2 0.359032 $F(3,66) = 12.32$ [0.000]**
Normality test: $Chi^2(2) =$ 8.9612   [0.0113]*
Hetero test: $F(6,63) =$ 1.1899   [0.3233]
Hetero-X test: $F(9,60) =$ 1.0580   [0.4065]
RESET23 test: $F(2,64) =$ 0.83131   [0.4401]
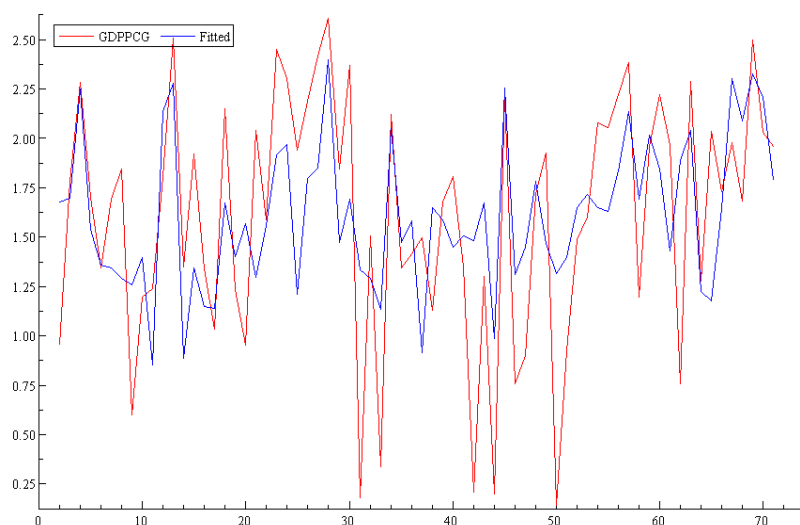
Figure 6.8   Explanatory Power of the Specific Model, 2000 –2008 (Outliers Excluded)

6.4   Discussion and Conclusion

This part of the thesis aims to interpret the results of the empirical studies which based on the general to specific models. Modeling the real world and interpreting the results both for Turkey and for theoretical literature is significant task of the thesis. But before reaching to

conclusion through the model results, discussing some limits and features of models and changes in the planning approach are significant.

Models aim to simulate the real world. Regional growth is not closed or isolated system that can be simulated. Specification errors, proxy selection, data availability and data problems limit such studies. In order to overcome such problems, several error tests have been implemented, but establishing an excellent model that simulates the real world is almost impossible.

The thesis attempting to determine the factors that affect growth, in fact, try to determine causality between dependent and independent variables. However this study and interpretations are done being aware of determinism is no more dominant in both social and natural sciences and the importance of the concept of contingency is being boosted.

Results of the general and specific models (covering 1980-2008 period, 1980-2000 period and 2000-2008 period) are summarized in Table 6.12. If a factor that is found statistically significant in more than two models, it can be defined as robust regional growth determinant of Turkey's regions. Three factors; initial condition (IGDPPC), capital and saving (DepPC), and production factor (ShLabFor) is here defined as robust determinants of growth, according to general model. General models also emphasis incentives.

Table 6.12   Main Result of General and Specific Models (Outliers Excluded)

	General Models			Specific Models		
	1980-2008	1980-2000	2000-2008	1980-2008	1980-2000	2000-2008
IGDPPC	-	-	-	-	-	-
ShLabFor	+	+		+	+	
DepPC	+	+		+	+	+
TPubExp						
TIncInvPC	+			+		
PRD						
HerfConc						
NThPC		-				
NOIZPI			-			
HerfSpec						+
EstFounPC			+			
ShUniGr						
NUniv						

Testing the validity of the competing theoretical models can be helpful to evaluate the explanatory power of theoretical frameworks. Validity of competing theoretical explanations can be compared by means of R^2 (explanation amount of variance of the dependent variable by the explanatory variables) and F-test (fitting amount of proposed model to the data). Test of validity of the competing theoretical models are given in Table 6.13 (full data) and Table 6.14 (outliers excluded).

Table 6.13   Validity of the Competing Theoretical Frameworks (Full Data)

Theoretical Frameworks	1980-2008	1980-2000	2000-2008
Market dynamics	R^2 0.427169 F(3,63) = 15.66 [0.000]**	R^2 0.206494 F(3,60) = 5.205 [0.003]**	R^2 0.376068 F(3,69) = 13.86 [0.000]**
Role of government	R^2 0.0665528 F(3,63) = 1.497 [0.224]	R^2 0.0320473 F(3,60) = 0.6622 [0.579]	R^2 0.282421 F(3,69) = 9.052 [0.000]**
Territorial external factors	R^2 0.0137869 F(3,63) = 0.2936 [0.830]	R^2 0.0414521 F(3,60) = 0.8649 [0.464]	R^2 0.0127396 F(3,69) = 0.2968 [0.828]
New production system and spaces	R^2 0.0215435 F(2,64) = 0.7046 [0.498]	R^2 0.0142537 F(2,61) = 0.441 [0.645]	R^2 0.00106376 F(2,70) = 0.03727 [0.963]
Innovation	R^2 0.0442299 F(2,64) = 1.481 [0.235]	R^2 0.00056619 F(2,61) = 0.01728 [0.983]	R^2 0.0656924 F(2,70) = 2.461 [0.093]

Results of full data and outlier excluded models are same for the validity tests. Market dynamics have high explanation and fit the data well in all three periods. This shows that in all three periods, market dynamics have significant contribution to GDP per capita growth in Turkish regions. On the other hand, role of government has high explanation and fit the data well in 2000-2008 period. Other theoretical frameworks cannot explain and fit the data individually. This can be interpreted as recent theories emphasizing local dynamics cannot individually explain Turkish regional growth for 1980-2008 period.

Table 6.14   Validity of the Competing Theoretical Frameworks (Outliers Excluded)

Theoretical Frameworks	1980-2008	1980-2000[*]	2000-2008
Market dynamics	R^2 0.452512 F(3,62) = 17.08 [0.000]**	R^2 0.206494 F(3,60) = 5.205 [0.003]**	R^2 0.3613 F(3,66) = 12.44 [0.000]**
Role of government	R^2 0.0608765 F(3,62) = 1.34 [0.270]	R^2 0.0320473 F(3,60) = 0.6622 [0.579]	R^2 0.228829 F(3,66) = 6.528 [0.001]**
Territorial external factors	R^2 0.0302879 F(3,62) = 0.6455 [0.589]	R^2 0.0414521 F(3,60) = 0.8649 [0.464]	R^2 0.0154386 F(3,66) = 0.345 [0.793]
New production system and spaces	R^2 0.00273639 F(2,63) = 0.08643 [0.917]	R^2 0.0142537 F(2,61) = 0.441 [0.645]	R^2 0.00114923 F(2,67) = 0.03854 [0.962]
Innovation	R^2 0.0180775 F(2,63) = 0.5799 [0.563]	R^2 0.00056619 F(2,61) = 0.01728 [0.983]	R^2 0.0748486 F(2,67) = 2.71 [0.074]

[*] *1980-2000 data has no outlier value so results of full data and outliers excluded are same.*

CHAPTER 7

EVALUATION AND CONCLUSION

7.1 Introduction

Significant changes occurred in planning paradigm, regional development paradigm and regional development policies. Planning paradigm has been changed, parallel to the changes in the concepts like democracy, scientific knowledge, control and calculations methods, from rationalist comprehensive planning to participatory strategic planning. Main characteristics of recent planning approach are participatory, strategic and contingent.

Regional development discourses and theories also performed significant changes. Traditional theories were dominant in the period starting with the born of regional sciences in the post-war era to the 1970s crisis. In this period, it was believed that regional development can be initiated by external support mechanisms. Strong nation state and measures for public resource transfers for development were the main characteristics of the first period.

1970 crisis brought new regional development approach based on local production dynamics. Flexible production system, industrial districts and clusters were identified as the new ways of local economic success. Sources of regional development, in this period, were defined as local dynamics and assets such as human capital, vertical disintegration, horizontally integrated economy, and collective entrepreneurship.

The increasing effect of globalization caused to development of a new paradigm. Knowledge, learning and innovation raised its significance in this period. Role of state to develop the local dynamics and assets are distinctly mentioned in this period.

As a result of post rationalization efforts, growing emphasis occurred on the importance of endogenous potentials for regional development. The emphasizes have gradually increased since 1970s. Recent development literature overemphasizes endogenous factors and self-development.

Changes in the regional development discourses also affected regional policies, policy tools and actors. Due to the growing emphasis on endogenous potentials, endogenous factors and self-development discourses became dominant in regional development policies and implementations. New regional policies have certainly changed the traditional role of state in regional development. However dynamics of regional development in less developed nations and less developed regions are have not clearly defined and not empirically tested yet. This is an unseen obstacle for undeveloped regions that do not have self-development capability.

The historical progress of economic development discourses and regional policy implementations raise important questions in relation to the policies and practices of regional economic development. In a dynamic and globalizing world, regions and cities rather than nations are defined as actors. The economic processes shaping regional economies have been significant research area. These processes are important for policy makers to build appropriate policies in order to improve the economic conditions. Recent development literature overemphasizes endogenous factors and self-development. New regional policies have certainly changed the traditional role of state in regional development.

Turkey has closely followed changes in regional paradigms and policies in the world, but implementation of these developments into Turkey's regional policy arena has not successfully realized. Although the removal of regional disparities has been the main regional policy goal, the regional and sub-regional development efforts in Turkey have not proceeded on a comprehensive and consistent path.

1980s is a turning point for Turkish regional policy. Before 1980, state was the only actor and direct public investment was the main policy tool. After 1980, direct public investments lost significance and local dynamics and investments and regulations that support local dynamics have gained importance.

After 2000, efforts for integration with the European Union and localization efforts have increased. In this context, emphases are placed on activities towards creating a development environment based on local dynamics, internal potentials and institutional capacity.

The purpose of this thesis is to develop an understanding of dynamics of regional economic development in the context of Turkey, developing country.

This study has adopted theoretically informed empirical analysis as a methodology. This methodology involves an econometric model which is based on the selection of proxy measures which are drawn out of theoretical and empirical analysis of those measures.

The theoretical review includes classical growth theory (Smith, 1776), Keynesian theory (Keynes, 1936), neoclassical growth theory (Solow, 1957 and Swan, 1956), endogenous growth theory (Howitt, 2008; Brzezinski and Dzielinski, 2009; Segerstrom, Anant and Dinopoulos, 1990; Grossman and Helpman, 1991a; 1991b; 1991c; Aghion and Howitt, 1992; Dinopoulos, 1994).linear stages (Rostow, 1956; 1960 and Gerschenkron, 1962) structural change models (Lewis, 1954; Chenery, 1960; Chenery and Taylor, 1968), economic base theory (Hoyt, 1954; Douglass, 1955), growth pole theory (Perroux, 1955), flexible production theory (Scott and Storper, 1992), new industrial district and clustering (Becattini, 1979; Scott, 1988; Porter, 2000), Innovative Milieu (Aydalot, 1986; Maillat, 1995; Maillat 1996; Maillat and Lecoq, 1992), learning regions (Florida, 1995) and regional innovation system (Cooke, et. al. 1997).

From these models, five set of theoretical frameworks are identified:

- Theories emphasizing market dynamics,

- Theories emphasizing the role of government,

- Theories emphasizing territorial external factors,

- Theories emphasizing new production system and spaces,

- Innovation based territorial models.

The thesis attempted to empirically define regional growth factors and the usefulness of five theoretical frameworks of economic growth for explaining the dynamics of regional economic growth in Turkey for the period of 1980 – 2008. From the theoretical models, thirteen broad dimensions representing the hypothesized drivers of regional economic change are derived and incorporated into an empirical modeling process.

A general model is developed within which the dimensions derived for the competing theoretical models are nested by using general to specific methods specific models are obtained.

This chapter evaluates the main findings of this study, and reflects to theoretical and political frameworks. The remaining sections of this chapter discuss the main contributions to theoretical and empirical economic geography and regional policies arena of Turkey.

7.2 Results of the Empirical Study: Contributions to the Theoretical and Empirical Field

The results of the empirical modeling process are clear and supporting hypothesis of the thesis, but must be interpreted with some caution. First, models aim to simulate the real world. Regional growth is not closed or isolated system that can be easily simulated. Specification errors, proxy selection, data availability and data problems limit such studies. In order to overcome such problems, several error tests have been implemented, but establishing an excellent model that simulates the real world is almost impossible.

Second, the thesis attempting to determine the factors that affect growth, in fact, try to determine causality between dependent and independent variables. But this study and interpretations are done being aware of that determinism is no more dominant in both social and natural sciences and the importance of the concept of contingency is being boosted.

All the models offer only partial explanations of regional growth in Turkey during the analyzed period, with each refining and elaborating different subsets of processes. Given the validity of the model specifications, two theoretical frameworks can explain regional growth in Turkey.

First, the most broadly supported theoretical framework (including classical, neo-classical and endogenous growth theories) is the market dynamics. Besides, significant elements of these theories are found significant support in the empirical Turkey situation. Initial condition, labor force and capital and saving are central to classical, neo-classical and endogenous growth theories. Besides their impacts on regional growth in Turkey is surprisingly strong.

Second, theories emphasizing the role of government are broadly supported by empirical study. Public expenditures and incentives have positive contribution to growth in Turkish context.

In the following section, effect of each factor to the growth is briefly summarized and evaluated in terms of contribution to the theoretical literature.

Initial condition as measured by initial GDP per capita is the strongest growth factor in Turkey. There is negative relationship between initial GDP per capita and GDP per capita growth which is consistent with convergence hypothesis. There is significant number of empirical study at national and regional scale supporting convergence hypothesis (Barro and Sala-i-Martin (1991, 1992a, 1992b, 1999; Bergström, 1998; Kangasharju, 1998; Tansel and Güngör, 1998). On the other hand a huge amount of studies (Erk, Ateş and Direkçi, 2000; Gezici and Hewings, 2001; Altınbaş, Doğruel and Güneş, 2002; Doğruel and Doğruel, 2003; Gezici and Hewings, 2004; Aldan, 2005) show that there is no convergence. Besides, some studies (Gezici and Hewings, 2007; Sarı and Güven, 2007; Karaca, 2004; Berber, Yamak and Artan, 2000) find evidence even for divergence.

Labor force is measured as the share of labor force in total population has positive effect on growth. Empirical analysis suggests that labor force enhances local and regional economic development in Turkey.

Capital and saving as measured by bank deposit per capita is defined as strong growth determinants for Turkey case. Bank deposits per capita are concentrated on developed regions i.e. Ankara, İstanbul, İzmir, Muğla, Antalya and Eskişehir. There is significant number of empirical study at national and regional scale supporting capital and saving has positive effect on growth. The finding is consistent with empirical studies.

In Turkey, public investment, particularly public infrastructure and social investment, is recognized as the most important determinant of capital accumulation. Public expenditure is measured as total public expenditure per capita has positive effect on GDP per capita growth according to empirical results. There are empirical studies supporting this result (Ram, 1986;

Devarajan et al., 1996; Sahoo, 2001), but some studies could not find relation between public expenditure and growth (i.e. Ghali, 1997; Frimpong and Oteng-Abayie, 2009).

Government incentive is used to guide and orient private sector investments and the priority regions in development policy is employed in the spatial distribution of incentives. The distribution of total number of incentive certificates issued in 1980-2008 period to the NUTS 3 regions of Turkey shows that Istanbul, Izmir, Ankara and Bursa are at top. This pattern show that developed regions gathered more incentives. There is no consensus on the effect of government incentives on growth; while some studies found positive effect on growth and employment (Bartik, 1992; Loh, 1995; Goss and Phillips, 1999; Schalk and Untiedt, 2000; Bondonio and Greenbaum, 2007), some (Ingram and Pearson, 1981; Borello, 1995; Fisher and Peters, 1998; Ayele, 2006) argue that effect of incentives can be ignored. The empirical results of the study contribute to literature arguing incentives have positive effect on growth.

There is no strong correlation between agglomeration on a specific sector and GDP per capita growth in Turkish context. But the sign of the relation is positive which means higher level of agglomeration on a specific sector generate more GDP per capita.

Knowledge creation is measured by number of thesis (M.Sc., Ph.D., medical specialty thesis and doctoral thesis in art) per million population. Recent growth literature focuses on knowledge creation, dissemination of knowledge and learning. They also emphasize high intellectual knowledge and depend less on the traditional production factors of labor and land. Empirical study cannot find clear relation between knowledge creation and growth.

Jointly used infrastructure (measured by number of OIZ plot) is emphasized by flexible production theory, new industrial district and cluster and partially by growth pole is also not individually statistically significant in the present analysis but it has positive sign as consistent with expectations.

Studies of sectoral specialization have drawn attention to the importance of intimate relationship between the principles of specialization and the division of labor growth (Isard, 1960; Lampard, 1955; Phelps and Ozawa, 2003; Scott, 1982, 1988a; Sayer and Walker, 1992; Storper and Walker, 1989; Walker, 1985). There is no strong correlation between specialization measured by Herfindahl specialization index and GDP per capita growth.

Established new foundations per million population are employed to measure trust. Trust is emphasized mainly by industrial district and cluster theories. Recent innovation based theories also highlight trust as growth factor. The empirical result is not so clear in terms of effect of trust to GDP per capita growth. Only the results of general model for 2000-2008 period clearly show the positive impact of trust on GDP per capita growth. Several empirical study (Zak and Knack, 2001; Tappeiner, Hauser and Walde, 2008) also indicate that growth is related to trust. This result weakly contribute to empirical literature arguing trust has positive effect on growth.

There is a rich literature on the rise of knowledge economy in globalized world, and increasing importance of regions in the global economic system. In this global economic system, global and national economy is described with reference to the local and regional dynamics and assets. Parallel to the changes in the macro growth theories, regional development theories focused on local dynamics and assets. There is over emphasis on endogenous factors in theoretical field which is fertilized by empirical studies. The empirical studies are the case studies mainly from developed countries or developed regions. Besides, the empirical field has no comprehensive study analyzing all success factors. Comprehensive empirical studies are needed in terms of geography, time and factors. Role of state and exogenous supports are ignored in such empirical studies and so in theoretical field.

The thesis contributes to empirical field by taking Turkey, a developing country, as case and comprehensively considers growth factors. Besides, interpreting the results to the theoretical field is much more valuable. The thesis shows that public investments and incentives still have significant contribution to regional growth. Although recent theories give role of

encouraging the local dynamics for growth to the state, they ignore the direct contribution to growth.

It is not the aim of this thesis to argue that endogenous factors such as learning capacity, knowledge, innovation capacity, human capital, trust, networks are unimportant to a region's economic performance. Clearly these are important but not sufficient for regional development. Such a cohesive argument for the importance of exogenous investment and interventions has been lacking.

7.3   Interpreting the Empirical Results to the Turkish Regional Policy

Regional development policies are mainly formed depending on theoretical framework, therefore currently local dynamics are on the center of regional development policy discourses. However, state is still one of the strongest actors in the regional development arena in most of the developed countries and in EU.

Turkey, as mentioned above, has closely watched the changes in regional paradigms and policies in the world, but implementation of these developments into Turkey's regional policy arena has not successfully realized. Turkey experienced a dilemma between national development and decreasing regional development inequalities, so in order to fasten national economic development, the problems of regional development differences have been ignored. The existing regional development differences show that regional development policies of Turkey are not successful.

After 1980 with the liberalization policies, regions and cities that have endogenous potentials and able to connect to global networks created success stories. On the other hand, regions that do not have local potentials could not connect to global network are certified as looser of the global competition. As mentioned above, empirical studies taking successful regions as case study can provide evidence for the recent theories. Besides, such studies lead to wrong policies.

After 1980, direct public investments lost significance and local dynamics and investments, regulations that support local dynamics has gained importance. After 2000, efforts for integration with the European Union and localization efforts have increased. In this context; emphasis are placed on activities towards creating a development environment based on local dynamics and internal potential, increasing institutional capacity at the local.

The empirical results illustrate that it is ineffective to encourage regional development policies that only depends on regional potentials. Moreover, exogenous investments and incentives improve the growth of regions. The result is significant in terms of regions that do not have endogenous potentials, have not integrated to global network. The role of state in regional development must be redefined as encouraging regional development rather than encouraging endogenous potentials.

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APPENDICES

APPENDIX A
EMPIRICAL LITERATURE SUMMARY

Table A.1   Empirical Literature Summary

Study and Methodology	Factor	Indicator/ Proxy	Result
Study: Temple and Woessmann (2004) **Methodology**: Cross-section growth regressions, Quantile regression; 76-country sample for 1960, 1980 and 1996	Dependent variable	Log difference of GDP per worker	Highly positively correlated
	Investment	Investment share of GDP per capita	Highly positively correlated
	Schooling year	Average years of schooling in the working-age population	Highly positively correlated
	Productivity	Ln(labor-force growth+ productivity growth+ depreciation)	Highly positively correlated
	Structural change	Structural change terms	Highly positively correlated
	Agriculture employment	Agricultural employment share	Highly positively correlated
Study: Robinson (1971) **Methodology**: Cross-section regression of 39 less developed countries, between 1958-1966	Dependent variable	Growth of GDP	Positively correlated
	Investment	Investment share of GDP	Positively correlated
	Labor growth	Total amount of labor	Insignificant
	Foreign balances	Net foreign balances	Positively correlated
	Agriculture share	Change in agriculture share	Positively correlated
	Urbanization	Change in city share of population	Positively correlated
Study: Rittenberger (1989) **Methodology**: Cross-section regression of 57 developing countries, between1970-1982	Dependent variable	Growth of GDP	Positively correlated
	Investment	Investment share of GDP	Significant in some regressions
	Labor growth	Total amount of labor	Positively correlated
	Export	Growth of exports	Significant in some regressions
	Agriculture growth	Share of agriculture in GDP	Significant in some regressions
	Manufacturing growth	Share of Manufacturing in GDP	Significant in some regressions
	Services growth	Share of Services in GDP	Positively correlated
Study: Hwa(1983) **Methodology**: Cross-section regression of 57 countries, between1970-1979	Dependent variable	Growth of GDP	Positively correlated
	Investment	Investment share of GDP	Positively correlated
	Agriculture growth	Share of agriculture in GDP	Positively correlated
	Export	Growth of exports	Positively correlated
	Labor growth	Total amount of labor	Positively correlated
	Inflation variable	Inflation	Negatively correlated

Table A.1 **(continued)**

Study and Methodology	Factor	Indicator/ Proxy	Result
Study: Branson, Guerrero, and Gunter (1998) **Methodology**: Cross-Country Regression Analysis for 93 countries, between 1970-1994	**Sectoral Composition of Output**	Share of agriculture in GDP (in %)	Negatively correlated
		Share of industry in GDP (in %)	Positively correlated
		Share of manufacturing in GDP (in %)	Positively correlated
		Share of services in GDP (in %)	Positively correlated
	Investment Shares in GDP	Gross domestic investment	Positively correlated
		Gross domestic fixed investment	Positively correlated
		Domestic fixed private investment	Positively correlated
		Domestic fixed public investment	Positively correlated
	Consumption and Savings	Total consumption	Negatively correlated
		Private consumption	Negatively correlated
		General government consumption	
		Gross domestic savings	Positively correlated
	Government Expenditures and Revenues	Total government expenditure (as % or GDP)	Positively correlated
		Total revenue (as % or GDP)	Positively correlated
		Tax revenue (as % or GDP)	
		Fiscal deficit (as % or GDP)	
	Inflation and Money Supply	Inflation rate (%) based on GDP deflator	
		Inflation rate (%) based on CPI	
		Money supply M1 (as % of GDP)	
		Annual growth rate of M1 (%)	

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	Overall Trade and Import Variables	Money supply M2 (as % of GDP)	
		Annual growth rate of M2 (%)	
		Current account balance (as % of GDP)	
		Capital account balance (as % of GDP)	
		Sum of exports and imports (as % of GDP)	
		Total imports (as % of GDP)	
		Merchandise imports (as % of GDP)	
	Export Variables	Total exports (as % of GDP)	Positively correlated
		Merchandise exports (as % of GDP)	Positively correlated
		Exports of machinery (as % of GDP)	
		Exports of machinery (as % of total exports)	
		Primary exports (as % of GDP)	Negatively correlated
		Primary exports (as % of total exports)	
	Export Product Concentration	Share of the major export good in TE	Negatively correlated
		Share of the second major export good in TE	Negatively correlated
		Share of the third major export good in TE	Negatively correlated
		Export product concentration index	Negatively correlated
	Market Power in World Export Markets	Share of the major export good in WE	Positively correlated
		Share of the second major export good in WE	Positively correlated
		Share of the third major export good in WE	Positively correlated
		Index of market power in WEs	Positively correlated

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	Financial Market Development	The ratio of liquid liabilities of the financial system to GDP	Positively correlated
		The ratio of deposit money bank domestic assets to deposit money bank domestic assets plus central bank domestic assets	Positively correlated
		The proportion of credit allocated to private enterprises by the financial system	Positively correlated
		The ratio of claims on the nonfinancial private sector to GDP	Positively correlated
Study: Becker, Peter, Egger, Ehrlich and Fenge (2008)	Dependent variable	GDP at purchasing power parity	
Methodology: NUTS2 regions of the EU12, EU15 and EU25 in the three programming periods 1989-93, 1994-99, and 2000-2006.	Employment share	total and sectoral employment (service share Industry share)	No significant employment effects during the period in which transfers are allocated
	Population density	population	
	Data on treatment under Objective 1	Objective 1 transfers	Objective 1 transfers exert a robust positive effect on GDP per capita growth
Study: Costa-i-Font and Rodriguez-Oreggia (2005)	Dependent variable	GDP per capita	
Methodology: Mexican regions, 1993-1998	Public investment	social investment	social investment does not exert a significant effect
		infrastructure investment	largely significant
Quantile regression	Initial condition	Initial per capita GDP	positive and significant in all the quantiles
Study: Pfouts (1957)	Dependent variable	Population	
Methodology: Twenty-Eight	Basic sector employment	Basic sector employment	Basic industries are not associate

Table A.1   (continued)

Study and Methodology	Factor	Indicator/Proxy	Result
Cities whose populations ranged from 100,000 to 300,000 for period of 1940 and 1950			with population changes.
	Service sector employment	Service sector employment for business and industry	Service industries rather than basic industries are associate with population changes.
Study: Armatlı-Köroğlu (2005)	Innovation capacity	Number of firms introduced to new product Number of firms introduced to new process	
Methodology: Nuts 3 regions cross section regression analysis and interviews with entrepreneurs	Educated workforce	the share of engineers in total workforce	No significant relationship
	innovation activities	The patent numbers in the last three years	No significant relationship
		number of quality certificate	positive relationship
		Firm networks (Number of the firm linkages in different types -supplier networks, customer networks, service networks etc.)	positive meaningful relation
Study: Bender, Harms and Rindermann (2002)	performance of the companies	return on equity;	For bigger companies clusters matter but tend to have negative performance aspects.
Methodology : regression analysis with a sample of 276 firms		return on assets	By contrast, the performance of smaller companies appears to be less influenced by cluster membership.
		sales per employee	
		growth rate of sales.	
Study: Beugelsdijk and Van Schaik (2005)	level of economic development	gross regional product per capita	A positive relationship between social capital and economic development
	social capital index -1	Trust.'	
Methodology: Regression	social capital index -2	civic engagement.	

Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
analysis, 54 regions belonging to 7 countries			
Study: knack and Keefer (1997)	Dependent variable	average annual growth in per capita income	
Methodology: *Two-stage least-squares and ordinary least squares*, a sample of 29 countries	trust and civic norms	membership in groups	unrelated
		Social capital	Not associated with improved economic performance.
		Trust index ("claiming government benefits which you are not entitled to" b) "avoiding a fare on public transport" c) "cheating on taxes if you have the chance" d) "keeping money that you have found" e) "failing to report damage you've done accidentally to a parked vehicle)	the coefficient indicates that a ten percentage point rise in trust is associated with an increase in growth of four-fifths of a percentage point'
Study: Zak and Knack (2001).	Dependent variable	Per capita income, 1970	
Methodology: *Two-stage least-squares and ordinary least squares* 41 countries, for period1970- 1992	Trust	Trust	Positively correlated
		Years of education, 1970	Positively correlated
		Investment goods price, 1970	Positively correlated
		Percent Catholic	
		Percent Muslim	Positively correlated
		Percent Eastern Orthodox	
Study: OECD (2001)	Principal indicator of regional economic performance	GDP per capita	
Methodology: Correlation analysis, 180 level 2 regions of the 15 member states of the EU for year 1995	Individual learning	Educational attainment (per cent of the population aged 25-59 years attaining educational Levels 1, 2 and 3 in 1995).	strong negative relationship between primary educational level and GDP per capita
strong positive relationship

Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
			between secondary primary educational level and GDP per capita
			no strong relationship between the percentage of the population completing tertiary level education and GDP per capita
	Organizational learning	R&D expenditures	strong positive relationship between R&D expenditures, patent application and GDP per capita

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	Individual learning and Organizational learning	Educational attainment (per cent of the population aged 25-59 years attaining educational Levels 1, 2 and 3 in 1995). Patent application (number per million inhabitants)	strong negative relationship between primary educational level and patent intensity no relationship between secondary educational level and patent intensity weak positive relationship between tertiary educational level and patent intensity
	Learning and social inclusion/ exclusion	Educational attainment (per cent of the population aged 25-59 years attaining educational Levels 1, 2 and 3 in 1995). Unemployment (as per cent of the workforce in 1995). Principal indicator of regional economic performance: GDP per capita	no significant correlation between the unemployment rate and the GDP per capita
Study: Tappeiner, G, Hauser, C and Walde, J. (2008)	innovation	Patent application	
	Hard economic factors	The R&D investments	Positively correlated with patent application

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Table A.1 (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
Methodology: Spatial autocorrelation, 51 Nuts 1 level, regions with a population from 3 to 7 million inhabitants from seven countries: Germany (16), France (8), Great Britain (11), Spain (7), Italy (5), and the Nether-lands (4), based on averages of data from 1997, 1999 and 2001	Human capital	per capita expenses on research and development	human capital are responsible for the spatial clustering of patenting activities
		percentage of (general) Human Resources in Science and Technology in total population	
		percentage of HRST in high technology sectors in total population	
	Soft social factors	average factorial value of Political Interest	Social capital in a region exert a statistically significant and economically substantial impact on the level of innovation of a region.
		average factorial value of Friendship Ties	
		average factorial value of Associational Activity average factorial value of Basic Trust	
		average factorial value of Technological and Self Development	The spatial concentration of social capital is as important as the concentration of R&D and human capital in explaining observed autocorrelation of innovation.
Study: Evangelista, Iammarino, Mastrostefano. and Silvani (2001) **Methodology** Cross regional coefficients of variation (CVARs) for each of the indicators proposed for the NUTS 2 regions of Italy	Innovation activity	% of innovation costs devoted to R&D	High correlation
		% of innovation costs devoted to design	High correlation
		% of innovation costs devoted to marketing	High correlation
		% of innovation costs devoted to patents	High correlation
		% of innovation costs devoted to trial production	Medium correlation
		% of innovation costs devoted to investment	Medium correlation
	Process/product orientation	% of firms introducing process innovations	Low correlation
		% of firms introducing product innovations	Low correlation

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
		% of firms introducing ((Proc+Proc&d)(Prod+Proc&d))/((Proc+Proc&d)+(Prod+Proc&d))	Low correlation
		% of firms giving importance to creating new markets	Medium correlation
		% of firms giving importance to extending the product range	Medium correlation
		% of firms giving importance to improving production flexibility	Medium correlation
		% of firms giving importance to lowering production costs	High correlation
	Innovation objectives	% of firms giving importance to replacing products	Low correlation
	Firms' performance-Input	% of firms giving importance to Innovation expenditure per employee	Medium correlation
		% of firms giving importance to Innovative investments per employee	High correlation
		% of total turnover related to products new for the firm	High correlation
	Firms' performance-Output	% of total turnover related to products new for the sector	Medium correlation
		% of total turnover related to products new in absolute terms	High correlation
	System's performance-Diffusion of innovation	% of innovating firms on total responding firms	Medium correlation
	System's performance-Interregional flows	% of innovation expenditure sustained by resident firms in the region of residence on the total regional expenditure	Medium correlation

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Table A.1   **(continued)**

Study and Methodology	Factor	Indicator/ Proxy	Result
		% of innovation expenditure sustained by firms resident in the region on the total expenditure sustained by the same firms	Low correlation
		% of firms giving importance to competitors	Low correlation
		% of firms giving importance to conferences and exhibitions	Medium correlation
		% of firms giving importance to consultant firms	Low correlation
		% of firms giving importance to customers	Medium correlation
	Information sources	% of firms giving importance to internal information sources	Medium correlation
		% of firms giving importance to patents	Low correlation
		% of firms giving importance to suppliers	Medium correlation
		% of firms giving importance to universities and public research institutes	Low correlation
		% of firms giving importance to economic constraints	Low correlation
		% of firms giving importance to risk to be imitated	Low correlation
		% of firms giving importance to lack of information on technologies and markets	Low correlation
		% of firms giving importance to legislative constraints	Low correlation
		% of firms giving importance to scarce responsiveness of customers	Low correlation
		% of firms giving importance to lack of technological opportunities	Low correlation
	Obstacles to innovation	% of firms giving importance to lack of external technological services	Low correlation

Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
		% of firms giving importance to financial incentives from EC	Low correlation
		% of firms giving importance to financial incentives from the public sector	Medium correlation
		% of firms giving importance to other financial incentives	Low correlation
		% of firms giving importance to public research orders	Low correlation
		% of firms giving importance to suppliers orders	Low correlation
		% of firms giving importance to research services	Low correlation
	Innovation policy	% of firms giving importance to technological services	Low correlation
	Firm size	Total no. of employees out of total no.of firms	High correlation
	Productivity	Total sales per employee	Medium correlation
	Relevance of science based industries	% of sales in science based industries	HIGH
	Relevance of specialized suppliers industries	% of sales in specialized suppliers industries	HIGH
	Relevance of scale intensive industries	% of sales in scale intensive industries	Medium correlation
	Relevance of suppliers dominated industries	% of sales in suppliers dominated industries	Low correlation
Study: Stimson, Robson and Shyy (2009a)	Dependent variable	Regional shift (from 1991 to 2001)/Labor Force (1991)	
	Industrial structure and size	Specialization Index for 1991 across 17	Positive impact

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	effects	industry sectors	
Methodology: Ordinary Least Squares (OLS) technique stepwise approach Non metropolitan Queensland, Australia		Change in Specialization Index from 1991 to 2001	Positive impact
		Structural Change Index for 1991 to 2001	
		Change in the Structure Change Index from 1991-1996 to 1996-2001	
		Log(Population for all persons - 1991)	Negative impact
		Percentage point change in population from 1991 to 2001	Negative impact
		Location Quotient for Manufacturing Industry in 1991	
		Change in Location Quotient for Manufacturing Industry from 1991 to 2001	
		Location Quotient for Property and Business Services Industry in 1991	Positive impact
		Change in Location Quotient for Property and Business Services Industry from 1991 to 2001	
		Location Quotient for Personal and Other Services Industry in 1991	
		Change in Location Quotient for Personal and Other Services Industry from 1991 to 2001	
	Labor force participation	Unemployment rate in 1991 (for all persons)	Negative impact
		Unemployment rate change from 1991 to 2001 (for all persons)	Negative impact
	Human capital and income	Log(Average Annual Income for 2001)	Positive impact
		Proportion of Population with a Bachelor Degree or higher in 1991	Negative impact

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
		Change in Proportion of Population with a Bachelor Degree or higher from 1991 to 2001	Positive impact
		Proportion of Population with a Technical Qualifications in 1991	Negative impact
		Change in Proportion of Population with a Technical Qualifications from 1991 to 2001	
	Occupational shifts	Proportion of Total Occupations(all persons) as Routine Production Workers for 1991	
		Proportion of Total Occupations (all persons) as In-person service workers for 1991	
		Proportion of Total Occupations (all persons) as Symbolic analysts for 1991	
		Change in Proportion of Total Occupations(all persons) as Routine Production Workers from 1991 to 2001	Positive impact
		Change in Proportion of Total Occupations (all persons) as In-person service workers from 1991 to 2001	Positive impact
		Change in Proportion of Total Occupations (all persons) as Symbolic analysts from 1991 to 2001	
	Effects of coastal and inland location effects and of proximity to the metro area	Border is adjacent to coastline (Dummy variable 0=NO, 1=YES)	
		Is adjacent to the State Capital Statistical District (Dummy variable 0=NO, 1=YES)	
	dependent variable	Regional Shift (from 1991 to 2001)/Labor Force (1991)	

Study: Stimson, Robson and

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
Shyy (2009b) **Methodology:** Ordinary Least Squares (OLS) technique stepwise approach, non-metropolitan regions of the five mainland states of Australia (New South Wales, Victoria, Queensland, Western Australia and South Australia	Industrial structure and size effects	Specialization Index for 1991 across 17 industry sectors	Positive impact
		Change in Specialization Index from 1991 to 2001	Positive impact
		Structural Change Index for 1991 to 2001	Positive impact
		Change in the Structure Change Index from 1991-1996 to 1996-2001	Positive impact
		Log(Population for all persons - 1991)	Positive impact
		Percentage point change in population from 1991 to 2001	Positive impact
		Location Quotient for Manufacturing Industry in 1991	
		Change in Location Quotient for Manufacturing Industry from 1991 to 2001	
		Location Quotient for Property and Business Services Industry in 1991	
		Change in Location Quotient for Property and Business Services Industry from 1991 to 2001	
		Location Quotient for Personal and Other Services Industry in 1991	
		Change in Location Quotient for Personal and Other Services Industry from 1991 to 2001	
	Labor force participation	Unemployment rate in 1991 (for all persons)	
		Unemployment rate change from 1991 to 2001 (for all persons)	Negative impact
	Human capital and income	Log(Average Annual Income for 2001)	
		Proportion of Population with a Bachelor	Negative impact

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Table A.1 **(continued)**

Study and Methodology	Factor	Indicator/ Proxy	Result
		Degree or higher in 1991	
		Change in Proportion of Population with a Bachelor Degree or higher from 1991 to 2001	Positive impact
		Proportion of Population with a Technical Qualifications in 1991	
		Change in Proportion of Population with a Technical Qualifications from 1991 to 2001	Negative impact
	Occupational shifts	Proportion of Total Occupations(all persons) as Routine Production Workers for 1991	
		Proportion of Total Occupations (all persons) as In-person service workers for 1991	
		Proportion of Total Occupations (all persons) as Symbolic analysts for 1991	
		Change in Proportion of Total Occupations(all persons) as Routine Production Workers from 1991 to 2001	
		Change in Proportion of Total Occupations (all persons) as In-person service workers from 1991 to 2001	Positive impact
		Change in Proportion of Total Occupations (all persons) as Symbolic analysts from 1991 to 2001	
	Effects of coastal and inland location effects and of proximity to the metro area	Border is adjacent to coastline (Dummy variable 0=NO, 1=YES)	
		Is adjacent to the State Capital Statistical District (SD) (Dummy variable 0=NO, 1=YES)	

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
Study: Garlick, Taylor, and Plummer (2007a) **Methodology** General-to-specific model reduction strategy on the gap-convergence model, 94 nodal regions covering the whole of Australia 1984-2002 (11 case study regions explored through qualitative processes)		Relative regional growth over the period 1984–2002 has been ascertained using changes in unemployment rate relativities (Plummer & Taylor 2001a, 2001b) as a universal proxy.	
	Technological leadership at the enterprise level	An index of the presence of high-technology industries	Positive significant
	Knowledge creation and access to information	An index of access to information	Positive insignificant
	Locational integration of small firms	Percentage of establishments in multi-locational enterprises	Indeterminate
	Infrastructure and institutional support	Industry assistance	Negative significant
	Human resources	Percentage of working population without a degree	Negative significant
	Power of large corporations	Index of corporate control	Positive insignificant
	Local demand and interregional trade	Index of intermediate goods market access	Negative insignificant
	Local sectoral specialization	Index of specialization	Positive significant
Study: Cambridge Econometrics (2009) **Methodology:** Bayesian analysis, the LASSO approach	Dependent variable	Growth rate of real GDP per capita	
		Growth rate of GDP level	
	Initial productivity level	Initial real GDP per capita (in logs)	Positively correlated
	Population and size	Growth rate of population	
	Initial sectoral structure	Initial share of NACE A and B (Agriculture)	

Table A.1   **(continued)**

Study and Methodology	Factor	Indicator/ Proxy	Result
to model reduction and quantile growth regressions, 255 nuts 2 regions of EU		(Share in nominal gross value added)	
		Initial share of NACE C to E (Mining, Manufacturing and Energy) (Share in nominal gross value added)	
		Initial share of NACE J to K (Business services) (Share in nominal gross value added)	
	Density	Initial output density (GDP in millions. / area in km2; initial year)	Positively correlated
		Initial employment density (Employed persons in 1000/ area in km2; initial year)	Positively correlated
		Initial population density (Population in 1000 / area in km2; initial year)	Negatively correlated
	Internet and telecommunication	Proportion of firms with own website regression	
		A typology of levels of household telecommunications uptake	
		A typology of estimated levels of business telecommunications access and uptake	
	Regional typologies and other variables	Settlement structure (Settlement Structure Typology,	
		Coast (0: NO COAST, 1: COAST)	
		Border (0: NO BORDER, 1: BORDER)	
		Pentagon EU 27 plus 2 (The Pentagon is shaped by London, Paris, Munich, Milan and Hamburg.)	
		Objective 1" regions	
		Capital cities (0: region without capital cities; 1: capital cities)	Positively correlated

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
		Extreme temperatures	
		Sum of all weighted hazard values	
		Lifelong learning	
		Distance to Frankfurt (km)	
		Distance to capital city (km)	
	Infrastructure	Number of airports	
		Regions with seaports (1: regions with seaports; 0: no seaports)	
		Airport density (Number of airports divided by area in square km)	
		Road density (Length of road network (in km) divided by area)	
		Rail density (Length of rail network (in km) divided by area)	
		Connectivity to commercial airports by car of the capital or centroid representative of the NUTS3 (CCA01N3; in hours)	
		Connectivity to commercial seaports by car of the capital or centroid representative of the NUTS3 (CCS01N3; in hours)	
		Potential accessibility air,	Positively correlated
		Potential accessibility rail	
		Potential accessibility road	
		Potential accessibility multimodal	
	Patents and high technology variables	Number of patents total (per 1000 persons)	
		Number of patents in high technology (per 1000 persons)	
		Number of patents in ICT (per 1000 persons)	

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Table A.1 (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
		Number of patents in biotechnology (per 1000 persons)	
		Share of patents in high technology (Share in total patents)	
		Share of patents in ICT (Share in total patents)	
		Share of patents in biotechnology (Share in total patents)	
	Employment patterns and labor market	Human resources in science and technology (core) (Share in persons employed)	
		Employment rate - high (Employment rate of high educated (initial))	
		Employment rate - medium (Employment rate of medium educated (initial))	
		Employment rate - low (Employment rate of low educated (initial))	
		Employment rate - total (Employment rate total (initial))	
		Unemployment rate - high (Unemployment rate of high educated (initial))	
		Unemployment rate - medium (Unemployment rate of medium educated (initial))	
		Unemployment rate - low (Unemployment rate of low educated (initial))	
		Unemployment rate - total (Unemployment rate total (initial))	
		Activity rate high (Activity rate of high educated (initial))	

Table A.1 (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
		Activity rate medium (Activity rate of medium educated (initial))	
		Activity rate low (Activity rate of low educated (initial))	
		Activity rate total (Activity rate total (initial))	
	Human capital	Share of high educated in working age population	Positively correlated
		Share of medium educated in working age population	
		Share of low educated in working age population	
	Gross fixed capital information	Share of GFCF in GVA	Positively correlated
Study: Plummer and Taylor (2001b) **Methodology:** General to specific modeling by using regional economic data for Australia from the period 1984 – 1992 (* Only robustly determinants are given here)	Growth	unemployment	
	Technological leadership at the enterprise level	Index of high-technology industries (date from the late 1980s)	
	Knowledge creation and access to information	Index of access to information (dat9 from the late 1980s)	high-tech industry and information access enhanced local growth but only in a minor way;
	Local integration of small firms	Percentage of establishments in multilocational enterprises (from 1992)	the local integration of enterprises has no more than a minor force impacting on local job growth.
	Infrastructure support and institutional thickness	Effective protection rate (in 1990)	institutional thickness restricted rather than enhanced local job growth
	Local human resource base	Percentag3 of working population without a degree (in 1991)	Positively related
	Power of large corporations affecting structure and strategy	Index of corporat3 control (from 1992)	
	Interregional trade and the extent	Index of intermediate market accessibility	

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	and nature of local demand	(dat9 from the late 1980s)	
Study: Beugelsdijk and van Schaik (2005)	Local sectoral specialization	Index of specialization (from 1990)	Positively related
Methodology: Cross section of 54 European regions, regression and robustness analysis	economic growth	Gross Regional Product	
	social capital/ generalized trust	Trust (answers to question: 'Generally speaking, would you say that most people can be trusted, or that you cannot be too careful in dealing with people?')	growth is not related to trust
	social capital/ associational activity	Active group membership (unpaid voluntary work for all kinds of civic associations)	Growth is positively related to social capital
	social capital/ associational activity	Passive group membership	growth is not so much related to passive group membership, as to active group membership.
Study Schneider and Wagner (2009)	Average growth rate of GDP per capita 1960-1996	Growth of GDP per capita at purchasing power parities between 1960 and 1996	
	East Asian dummy	Dummy for East Asian countries	Positively related
	Primary schooling in 1960	Enrollment rate in primary education in 1960	Positively related
Methodology: Adaptive Least Absolute Shrinkage and Selection Operator (Lasso), 68 variables (including the dependent variable, the annualized growth rate of GDP per capita between 1960 and 1996) for 88 countries.	Investment price	Average investment price level between 1960 and 1964 on purchasing power parity basis	
	GDP in 1960 (log)	Logarithm of GDP per capita in 1960	
	Fraction of tropical area	Proportion of country's land area within geographical tropics	Negatively related
	Population density coastal in 1960's	Coastal (within 100 km of coastline) population per coastal area in 1965	
	Malaria prevalence in 1960's	of malaria in 1966	Negatively related

Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	Life expectancy in 1960	Life expectancy in 1960	Positively related
	Fraction Confucian	Fraction of population Confucian	Negatively related
	African dummy	Dummy for Sub-Saharan countries	
	Latin American dummy	Dummy for Latin American countries	
	Fraction GDP in mining	Fraction of GDP in mining	
	Spanish colony	Dummy variable for former Spanish colonies	
	Years open 1950-1994	Number of years economy has been open between 1950 and 1994	
	Fraction Muslim	Fraction of population Muslim in 1960	
	Fraction Buddhist	Fraction of population Buddhist in 1960	Positively related
	Ethnolinguistic fractionalization	Average of five different indices of ethnolinguistic fractionalization which is the probability of two random people in a country not speaking the same language	
	Government consumption share 1960's	Share of expenditures on government consumption to GDP in 1961	
	Population density 1960	Population per area in 1960	
	Real exchange rate distortions	Real exchange rate distortions	
	Fraction speaking foreign language	Fraction of population speaking foreign language	
	Openness measure 1974	Ratio of exports plus imports to GDP, averaged over 1965 to 1974	
	Political rights	Political rights index	
	Government share of GDP in 1960's	Average share government spending to GDP between 1960–1964	
	Higher education in 1960	Enrollment rates in higher education	
	Fraction population in tropics	Proportion of country's population living in geographical tropics	
	Primary exports 1970	Fraction of primary exports in total exports in	

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
		1970	
	Public investment share	Average share of expenditures on public investment as fraction of GDP between 1960 and 1965	
	Fraction Protestant	Fraction of population Protestant in 1960	
	Fraction Hindu	Fraction of the population Hindu in 1960	
	Fraction population less than 15	Fraction of younger than 15 years in 1960	
	Air distance to big cities	Logarithm of minimal distance (in km) from New York, Rotterdam, or Tokyo	
	Nominal GDP share 1960's	Average share of nominal government spending to nominal GDP between 1960 and 1964	
	Absolute latitude	Absolute latitude	
	Fraction Catholic	Fraction of population Catholic in 1960	
	Fertility in 1960's	Fertility in 1960's	
	European dummy	Dummy for European economies	
	Outward orientation	Measure of outward orientation	
	Colony dummy	Dummy for former colony	
	Civil liberties	Index of civil liberties index in 1972	
	Revolutions and coups	Number of revolutions and military coups	Negatively related to growth
	British colony	Dummy for former British colony 1776	
	Hydrocarbon deposits in 1993	Log of hydrocarbon deposits in 1993	
	Fraction population over 65	Fraction of population older than 65 years in 1960	
	Defense spending share	Average share public expenditures on defense as fraction of GDP between 1960 and 1965	Positively related to growth
	Population in 1960	Population in 1960	

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	Terns of trade growth in 1960's	Growth of terns of trade in the 1960's	
	Public education spending share in GDP in 1960's	Average share public expenditures on education as of GDP between 1960 and 1965	
	Landlocked country dummy	Dummy for countries	
	Religious intensity	Religion measure	
	Size of economy	Logarithm of aggregate GDP in 1960	
	Socialist dummy	Dummy for under Socialist rule for considerable time during 1950 to 1995	
	English-speaking population	Fraction of population speaking English	
	Average inflation 1960-1990	Average inflation rate between 1960 and 1990	
	Oil-producing country dummy	Dummy for oil-producing country	
	Population growth rate 1960-1990	Average growth rate of population between 1960 and 1990	
	Timing of independence	"Timing of national independence measure: if before 1914; 1 if between 1914 and 1945; 2 if between 1946 and 1989; and 3 if after 1989"	
	Fraction of land area near navigable water	Proportion of country's land area within 100 km of ocean or ocean-navigable river	
	Square of inflation 1990	Square of average inflation rate between 1960 and 1990	
	Fraction spent in war 1960-1990	Fraction of time spent in war between 1960 and 1990	
	Land area	Area in km2	
	Tropical climate zone	Fraction tropical climate zone	
	Terns of trade ranking	Barro (1999)	
	Capitalism	Degree Capitalism index	

Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	Fraction Orthodox	Fraction of population Orthodox in 1960 - 1999	
	War participation 1960-1990	Indicator for countries that participated in external war between 1960 and 1990	
	Interior density	Interior (more than 100 from coastline) population per area in 1965	
Study Sala-i-Martin et al. (2004)	Average growth rate of GDP per capita 1960-1996	Growth of GDP per capita at purchasing power parities between 1960 and 1996	
Methodology: *Bayesian Averaging of Classical Estimates (BACE), which constructs estimates by averaging OLS coefficients across models.* 68 variables (including the dependent variable, the annualized growth rate of GDP per capita between 1960 and 1996) for 88 countries	East Asian dummy	Dummy for East Asian countries	Positively related
	Primary schooling in 1960	Enrollment rate in primary education in 1960	Positively related
	Investment price	Average investment price level between 1960 and 1964 on purchasing power parity basis	Positively related
	GDP in 1960 (log)	Logarithm of GDP per capita in 1960	Positively related
	Fraction of tropical area	Proportion of country's land area within geographical tropics	Negatively related
	Population density coastal in 1960's	Coastal (within 100 km of coastline) population per coastal area in 1965	Positively related
	Malaria prevalence in 1960's	of malaria in 1966	Negatively related
	Life expectancy in 1960	Life expectancy in 1960	Positively related
	Fraction Confucian	Fraction of population Confucian	
	African dummy	Dummy for Sub-Saharan countries	Negatively related
	Latin American dummy	Dummy for Latin American countries	Negatively related
	Fraction GDP in mining	Fraction of GDP in mining	Positively related
	Spanish colony	Dummy variable for former Spanish colonies	Negatively related
	Years open 1950-1994	Number of years economy has been open between 1950 and 1994	Positively related
	Fraction Muslim	Fraction of population Muslim in 1960	Positively related
	Fraction Buddhist	Fraction of population Buddhist in 1960	Positively related

Table A.1 (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	Ethnolinguistic fractionalization	Average of five different indices of ethnolinguistic fractionalization which is the probability of two random people in a country not speaking the same language	Negatively related
	Government consumption share 1960's	Share of expenditures on government consumption to GDP in 1961	Negatively related
	Population density 1960	Population per area in 1960	
	Real exchange rate distortions	Real exchange rate distortions	
	Fraction speaking foreign language	Fraction of population speaking foreign language	
	Openness measure 1974	Ratio of exports plus imports to GDP, averaged over 1965 to 1974	
	Political rights	Political rights index	
	Government share of GDP in 1960's	Average share government spending to GDP between 1960–1964	
	Higher education in 1960	Enrollment rates in higher education	
	Fraction population in tropics	Proportion of country's population living in geographical tropics	
	Primary exports 1970	Fraction of primary exports in total exports in 1970	
	Public investment share	Average share of expenditures on public investment as fraction of GDP between 1960 and 1965	
	Fraction Protestant	Fraction of population Protestant in 1960	
	Fraction Hindu	Fraction of the population Hindu in 1960	
	Fraction population less than 15	Fraction of younger than 15 years in 1960	
	Air distance to big cities	Logarithm of minimal distance (in km) from New York, Rotterdam, or Tokyo	
	Nominal GDP share 1960's	Average share of nominal government	

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
		spending to nominal GDP between 1960 and 1964	
	Absolute latitude	Absolute latitude	
	Fraction Catholic	Fraction of population Catholic in 1960	
	Fertility in 1960's	Fertility in 1960's	
	European dummy	Dummy for European economies	
	Outward orientation	Measure of outward orientation	
	Colony dummy	Dummy for former colony	
	Civil liberties	Index of civil liberties index in 1972	
	Revolutions and coups	Number of revolutions and military coups	
	British colony	Dummy for former British colony 1776	
	Hydrocarbon deposits in 1993	Log of hydrocarbon deposits in 1993	
	Fraction population over 65	Fraction of population older than 65 years in 1960	
	Defense spending share	Average share public expenditures on defense as fraction of GDP between 1960 and 1965	
	Population in 1960	Population in 1960	
	Terns of trade growth in 1960's	Growth of terns of trade in the 1960's	
	Public education spending share in GDP in 1960's	Average share public expenditures on education as of GDP between 1960 and 1965	
	Landlocked country dummy	Dummy for countries	
	Religious intensity	Religion measure	
	Size of economy	Logarithm of aggregate GDP in 1960	
	Socialist dummy	Dummy for under Socialist rule for considerable time during 1950 to 1995	
	English-speaking population	Fraction of population speaking English	

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Table A.1 **(continued)**

Study and Methodology	Factor	Indicator/ Proxy	Result
	Average inflation 1960-1990	Average inflation rate between 1960 and 1990	
	Oil-producing country dummy	Dummy for oil-producing country	
	Population growth rate 1960-1990	Average growth rate of population between 1960 and 1990	
	Timing of independence	"Timing of national independence measure: if before 1914; 1 if between 1914 and 1945; 2 if between 1946 and 1989; and 3 if after 1989"	
	Fraction of land area near navigable water	Proportion of country's land area within 100 km of ocean or ocean-navigable river	
	Square of inflation 1990	Square of average inflation rate between 1960 and 1990	
	Fraction spent in war 1960-1990	Fraction of time spent in war between 1960 and 1990	
	Land area	Area in km2	
	Tropical climate zone	Fraction tropical climate zone	
	Terns of trade ranking	Barro (1999)	
	Capitalism	Degree Capitalism index	
	Fraction Orthodox	Fraction of population Orthodox in 1960 - 1999	
	War participation 1960-1990	Indicator for countries that participated in external war between 1960 and 1990	
	Interior density	Interior (more than 100 from coastline) population per area in 1965	
Study: Sala-i-Martin (1997)	Log (GDP per capita 1960)	Log GDP per capita in 1960	
Methodology: 72 countries 63 variables regression analysis	Life Expectancy	Life expectancy in 1960	

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	Primary School Enrollment	Primary School Enrollment Rate in 1960	
	Equipment Investment		Positively related
	Number of Years Open Economy	Index computed by Sachs and Warner (1996).	Positively related
	Fraction of Confucius	Fraction of population that follows Confucius Religion	
	Rule of Law		Positively related
	Fraction of Muslim		Positively related
	Political Rights		Negatively related
	Latin American Dummy	Dummy for Latin American countries.	Positively related
	Sub-Sahara African Dummy	Dummy for Sub-Sahara African Countries.	Positively related
	Civil Liberties	Index of civil liberties from Knack and Keefer (1995).	Negatively related
	Revolutions and Coups	Number of military coups and revolutions	Positively related
	Fraction of GDP in Mining		Negatively related
	Standard Deviation of Black Market Premium 1960-89	Standard Deviation of Black Market Premium 1960-89	Negatively related
	Primary Exports in **1970**	Fraction of primary exports in total exports in 1970	Negatively related
	Degree of Capitalism	Index of degree in which economies favor capitalist forms of production	Negatively related
	War Dummy	Dummy for countries that have been involved in war any time between 1960 and 1990	Positively related
	Non-Equipment Investment		Positively related
	Absolute Latitude		Negatively related
	Exchange Rate Distortions		Negatively related
	Fraction of Protestant		

Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	Fraction of Buddhist		Positively related
	Fraction of Catholic		Negatively related
	Spanish Colony	Dummy variable for former Spanish colonies	
	Public Investment Share	Investment Share as fraction of GDP (BL93).	
	Fraction of the population able to speak English	Fraction of the population able to speak English	
	Defense Spending Share	Public Expenditures in defense as fraction of GDP	
	Age	Average age of the population	
	Public Consumption Share	Public consumption minus education and defense as fraction of GDP	
	Average Inflation Rate **60-90**		
	Size Labor Force (Scale Effect)	.	
	Foreign Language		
	Black Market Premium	Log of (I+Black Market Premium)	
	Standard Deviation of the Inflation Rate 1960-1990	Standard Deviation of the Inflation Rate 1960-1990	
	Growth Rate of Population	Average rate between 1960 and 1990	
	Ratio Workers to Population		
	Fraction of Jewish		
	Liquid Liabilities to GDP	Ratio of liquid liabilities to GDP (a measure of financial development)	
	Average years of primary schooling of total population	Average years of primary schooling of total population in 1960	
	French Colony	Dummy variable for former French colonies	
	Political Assassinations	Number of political assassinations	
	Standard Deviation of Domestic	Standard Deviation of Domestic Credit	

Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	Credit	1960-89	
	Product of average years of schooling and log of GDP per capita in 1960	Product of average years of schooling and log of GDP per capita in 1960	
	Fraction of Hindu	See Barro (1996).	
	Average years of education of total population	Average years of education of total population in 1960	
	Secondary School Enrollment	See BL93.	
	Ethnolinguistic Fractionalization	Probability two random people in a country do not speak same language	
	Outward Orientation	Measure of outward orientation	
	Index of Democracy 1965	Qualitative index of democratic freedom	
	Tariff Restrictions	Degree of tariff barriers	
	Free Trade Openness	Measure of Free Trade	
	Average years of higher education of total population	Average years of higher education of total population in 1960	
	Average Years of Sec School	Average years of secondary schooling of total population in 1960	
	Political Instability		
	Government Education Spending Share	Public Expenditures in education as fraction of GDP	
	Higher Education Enrollment	Enrollment rates in higher education in 1960	
	British Colony	Dummy variable for former British colonies	
	Urbanization Rate	Fraction of population living in cities	
	Growth of Domestic Credit 60-90	Growth rate of domestic credit 1960-90	
	Area (Scale Effect)	Total area of the country	
	Terms of Trade Growth	Growth of Terms of Trade between 1960 and 1990	

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Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
Study: Obersteiner and Wilk (1999)	Log (GDP per capita 1960)	Log GDP per capita in 1960	Positively related
Methodology: 72 countries 63 variables rough sets methodology	Life Expectancy	Life expectancy in 1960	
	Primary School Enrollment	Primary School Enrollment Rate in 1960	
	Equipment Investment		Positively related
	Number of Years Open Economy	Index computed by Sachs and Warner (1996).	Positively related
	Fraction of Confucius	Fraction of population that follows Confucius Religion	
	Rule of Law		
	Fraction of Muslim		
	Political Rights		Positively related
	Latin American Dummy	Dummy for Latin American countries.	
	Sub-Sahara African Dummy	Dummy for Sub-Sahara African Countries.	
	Civil Liberties	Index of civil liberties from Knack and Keefer (1995).	
	Revolutions and Coups	Number of military coups and revolutions	
	Fraction of GDP in Mining		
	Standard Deviation of Black Market Premium 1960-89	Standard Deviation of Black Market Premium 1960-89	
	Primary Exports in 1970	Fraction of primary exports in total exports in 1970	
	Degree of Capitalism	Index of degree in which economies favor capitalist forms of production	Related
	War Dummy	Dummy for countries that have been involved in war any time between 1960 and 1990	
	Non-Equipment Investment		Positively related

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Table A.1 (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	Absolute Latitude		
	Exchange Rate Distortions		
	Fraction of Protestant		
	Fraction of Buddhist		
	Fraction of Catholic		
	Spanish Colony	Dummy variable for former Spanish colonies	
	Public Investment Share	Investment Share as fraction of GDP (BL93).	Positively related
	Fraction of the population able to speak English	Fraction of the population able to speak English	
	Defense Spending Share	Public Expenditures in defense as fraction of GDP	
	Age	Average age of the population	
	Public Consumption Share	Public consumption minus education and defense as fraction of GDP	
	Average Inflation Rate **60-90**		
	Size Labor Force (Scale Effect)		
	Foreign Language	.	
	Black Market Premium	Log of (I+Black Market Premium)	
	Standard Deviation of the Inflation Rate 1960-1990	Standard Deviation of the Inflation Rate 1960-1990	
	Growth Rate of Population	Average rate between 1960 and 1990	
	Ratio Workers to Population		
	Fraction of Jewish		
	Liquid Liabilities to GDP	Ratio of liquid liabilities to GDP (a measure of financial development)	
	Average years of primary schooling of total population	Average years of primary schooling of total population in 1960	

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Table A.1 (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	French Colony	Dummy variable for former French colonies	
	Political Assassinations	Number of political assasionations	Positively related
	Standard Deviation of Domestic Credit	Standard Deviation of Domestic Credit 1960-89	
	Product of average years of schooling and log of GDP per capita in 1960	Product of average years of schooling and log of GDP per capita in 1960	
	Fraction of Hindu	See Barro (1996).	
	Average years of education of total population	Average years of education of total population in 1960	
	Secondary School Enrollment	See BL93.	
	Ethnolinguistic Fractionalization	Probability two random people in a country do not speak same language	
	Outward Orientation	Measure of outward orientation	
	Index of Democracy 1965	Qualitative index of democratic freedom	
	Tariff Restrictions	Degree of tariff barriers	
	Free Trade Openness	Measure of Free Trade	
	Average years of higher education of total population	Average years of higher education of total population in 1960	
	Average Years of Sec School	Average years of secondary schooling of total population in 1960	
	Political Instability		
	Government Education Spending Share	Public Expenditures in education as fraction of GDP	Positively related
	Higher Education Enrollment	Enrollment rates in higher education in 1960	Positively related
	British Colony	Dummy variable for former British colonies	
	Urbanization Rate	Fraction of population living in cities	
	Growth of Domestic Credit 60-90	Growth rate of domestic credit 1960-90	

Table A.1   (continued)

Study and Methodology	Factor	Indicator/ Proxy	Result
	Area (Scale Effect)	Total area of the country	
	Terms of Trade Growth	Growth of Terms of Trade between 1960 and 1990	

APPENDIX B

CORRELATION MATRIXES OF USED VARIABLES

Table B. 1   Correlation Matrix of Variables Used in 1980-2008 Model

		GDPPCG	IGDPPC	LabForP	DepPC	TPubExp	TIncInvPC	PRD	HerfConc	NThPC	NOIZPI	HerfSpec	EstFounPC	ShUniGr	NUniv
GDPPCG	Pearson Correlation	1	-,381(**)	,351(**)	-0,055	-0,105	0,107	0,240	-0,113	-0,006	0,018	-0,146	-0,048	-0,157	-0,036
	Sig. (2-tailed)		0,001	0,004	0,658	0,398	0,390	0,051	0,361	0,959	0,884	0,238	0,698	0,205	0,772
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67
IGDPPC	Pearson Correlation	-,381(**)	1	0,054	,793(**)	0,175	0,146	-,659(**)	,290(*)	0,138	0,150	,318(**)	,417(**)	,552(**)	,319(**)
	Sig. (2-tailed)	0,001		0,664	0,000	0,157	0,239	0,000	0,017	0,265	0,224	0,009	0,000	0,000	0,008
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67
LabForP	Pearson Correlation	,351(**)	0,054	1	0,088	-,290(*)	0,128	0,064	-,350(**)	-,258(*)	-0,045	0,053	-0,239	-,358(**)	-,506(**)
	Sig. (2-tailed)	0,004	0,664		0,480	0,017	0,303	0,608	0,004	0,035	0,720	0,671	0,051	0,003	0,000
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67
DepPC	Pearson Correlation	-0,055	,793(**)	0,088	1	0,067	0,000	-,577(**)	,325(**)	,273(*)	0,113	,286(*)	,527(**)	,671(**)	,455(**)
	Sig. (2-tailed)	0,658	0,000	0,480		0,590	0,998	0,000	0,007	0,025	0,363	0,019	0,000	0,000	0,000
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67
TPubExp	Pearson Correlation	-0,105	0,175	-,290(*)	0,067	1	-0,086	-,253(*)	0,097	0,138	0,062	-,279(*)	0,094	,253(*)	0,212
	Sig. (2-tailed)	0,398	0,157	0,017	0,590		0,489	0,039	0,433	0,266	0,621	0,022	0,449	0,039	0,086
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67
TIncInvPC	Pearson Correlation	0,107	0,146	0,128	0,000	-0,086	1	0,088	-0,006	-0,022	-0,025	0,190	-0,084	-0,050	-0,052
	Sig. (2-tailed)	0,390	0,239	0,303	0,998	0,489		0,480	0,961	0,861	0,844	0,124	0,497	0,687	0,676
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67
PRD	Pearson Correlation	0,240	-,659(**)	0,064	-,577(**)	-,253(*)	0,088	1	-0,181	-0,113	-0,234	-,327(**)	-,492(**)	-,497(**)	-,365(**)
	Sig. (2-tailed)	0,051	0,000	0,608	0,000	0,039	0,480		0,143	0,361	0,057	0,007	0,000	0,000	0,002
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67
HerfConc	Pearson Correlation	-0,113	,290(*)	-,350(**)	,325(**)	0,097	-0,006	-0,181	1	0,227	0,037	0,058	,603(**)	,509(**)	,405(**)
	Sig. (2-tailed)	0,361	0,017	0,004	0,007	0,433	0,961	0,143		0,064	0,763	0,638	0,000	0,000	0,001
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67
NThPC	Pearson Correlation	-0,006	0,138	-,258(*)	,273(*)	0,138	-0,022	-0,113	0,227	1	-0,045	0,096	,359(**)	,632(**)	,607(**)
	Sig. (2-tailed)	0,959	0,265	0,035	0,025	0,266	0,861	0,361	0,064		0,715	0,440	0,003	0,000	0,000
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67
NOIZPI	Pearson Correlation	0,018	0,150	-0,045	0,113	0,062	-0,025	-0,234	0,037	-0,045	1	,254(*)	,251(*)	0,023	0,154
	Sig. (2-tailed)	0,884	0,224	0,720	0,363	0,621	0,844	0,057	0,763	0,715		0,038	0,040	0,851	0,213
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67
HerfSpec	Pearson Correlation	-0,146	,318(**)	0,053	,286(*)	-,279(*)	0,190	-,327(**)	0,058	0,096	,254(*)	1	,409(**)	0,153	0,055
	Sig. (2-tailed)	0,238	0,009	0,671	0,019	0,022	0,124	0,007	0,638	0,440	0,038		0,001	0,216	0,657
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67
EstFounPC	Pearson Correlation	-0,048	,417(**)	-0,239	,527(**)	0,094	-0,084	-,492(**)	,603(**)	,359(**)	,251(*)	,409(**)	1	,669(**)	,588(**)
	Sig. (2-tailed)	0,698	0,000	0,051	0,000	0,449	0,497	0,000	0,000	0,003	0,040	0,001		0,000	0,000
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67
ShUniGr	Pearson Correlation	-0,157	,552(**)	-,358(**)	,671(**)	,253(*)	-0,050	-,497(**)	,509(**)	,632(**)	0,023	0,153	,669(**)	1	,784(**)
	Sig. (2-tailed)	0,205	0,000	0,003	0,000	0,039	0,687	0,000	0,000	0,000	0,851	0,216	0,000		0,000
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67
NUniv	Pearson Correlation	-0,036	,319(**)	-,506(**)	,455(**)	0,212	-0,052	-,365(**)	,405(**)	,607(**)	0,154	0,055	,588(**)	,784(**)	1
	Sig. (2-tailed)	0,772	0,008	0,000	0,000	0,086	0,676	0,002	0,001	0,000	0,213	0,657	0,000	0,000	
	N	67	67	67	67	67	67	67	67	67	67	67	67	67	67

**: Correlation is significant at the 0.01 level (2-tailed).
*: Correlation is significant at the 0.05 level (2-tailed).

Table B. 2   Correlation Matrix of Variables Used in 1980-2000 Model

		GDPPCG	IGDPPC	LabForP	DepPC	TPubExp	TIncInvPC	PRD	HerfConc	NThPC	NOIZPI	HerfSpec	EstFounPC	ShUniGr	NUniv
GDPPCG	Pearson Correlation	1	0,075	,311(*)	,273(*)	0,045	0,168	-0,012	-0,160	-0,153	0,037	0,106	-0,009	-0,024	-0,018
	Sig. (2-tailed)		0,556	0,012	0,029	0,722	0,184	0,924	0,206	0,227	0,771	0,406	0,941	0,852	0,886
	N	64	64	64	64	64	64	64	64	64	64	64	64	64	64
IGDPPC	Pearson Correlation	0,075	1	0,054	,793(**)	0,175	0,146	-,659(**)	,290(*)	0,138	0,150	,318(**)	,417(**)	,552(**)	,319(**)
	Sig. (2-tailed)	0,556		0,664	0,000	0,157	0,239	0,000	0,017	0,265	0,224	0,009	0,000	0,000	0,008
	N	64	67	67	67	67	67	67	67	67	67	67	67	67	67
LabForP	Pearson Correlation	,311(*)	0,054	1	0,088	-,290(*)	0,128	0,064	-,350(**)	-,258(*)	-0,045	0,053	-0,239	-,358(**)	-,506(**)
	Sig. (2-tailed)	0,012	0,664		0,480	0,017	0,303	0,608	0,004	0,035	0,720	0,671	0,051	0,003	0,000
	N	64	67	67	67	67	67	67	67	67	67	67	67	67	67
DepPC	Pearson Correlation	,273(*)	,793(**)	0,088	1	0,067	0,000	-,577(**)	,325(**)	,273(*)	0,113	,286(*)	,527(**)	,671(**)	,455(**)
	Sig. (2-tailed)	0,029	0,000	0,480		0,590	0,998	0,000	0,007	0,025	0,363	0,019	0,000	0,000	0,000
	N	64	67	67	67	67	67	67	67	67	67	67	67	67	67
TPubExp	Pearson Correlation	0,045	0,175	-,290(*)	0,067	1	-0,086	-,253(*)	0,097	0,138	0,062	-,279(*)	0,094	,253(*)	0,212
	Sig. (2-tailed)	0,722	0,157	0,017	0,590		0,489	0,039	0,433	0,266	0,621	0,022	0,449	0,039	0,086
	N	64	67	67	67	67	67	67	67	67	67	67	67	67	67
TIncInvPC	Pearson Correlation	0,168	0,146	0,128	0,000	-0,086	1	0,088	-0,006	-0,022	-0,025	0,190	-0,084	-0,050	-0,052
	Sig. (2-tailed)	0,184	0,239	0,303	0,998	0,489		0,480	0,961	0,861	0,844	0,124	0,497	0,687	0,676
	N	64	67	67	67	67	67	67	67	67	67	67	67	67	67
PRD	Pearson Correlation	-0,012	-,659(**)	0,064	-,577(**)	-,253(*)	0,088	1	-0,181	-0,113	-0,234	-,327(**)	-,492(**)	-,497(**)	-,365(**)
	Sig. (2-tailed)	0,924	0,000	0,608	0,000	0,039	0,480		0,143	0,361	0,057	0,007	0,000	0,000	0,002
	N	64	67	67	67	67	67	67	67	67	67	67	67	67	67
HerfConc	Pearson Correlation	-0,160	,290(*)	-,350(**)	,325(**)	0,097	-0,006	-0,181	1	0,227	0,037	0,058	,603(**)	,509(**)	,405(**)
	Sig. (2-tailed)	0,206	0,017	0,004	0,007	0,433	0,961	0,143		0,064	0,763	0,638	0,000	0,000	0,001
	N	64	67	67	67	67	67	67	67	67	67	67	67	67	67
NThPC	Pearson Correlation	-0,153	0,138	-,258(*)	,273(*)	0,138	-0,022	-0,113	0,227	1	-0,045	0,096	,359(**)	,632(**)	,607(**)
	Sig. (2-tailed)	0,227	0,265	0,035	0,025	0,266	0,861	0,361	0,064		0,715	0,440	0,003	0,000	0,000
	N	64	67	67	67	67	67	67	67	67	67	67	67	67	67
NOIZPI	Pearson Correlation	0,037	0,150	-0,045	0,113	0,062	-0,025	-0,234	0,037	-0,045	1	,254(*)	,251(*)	0,023	0,154
	Sig. (2-tailed)	0,771	0,224	0,720	0,363	0,621	0,844	0,057	0,763	0,715		0,038	0,040	0,851	0,213
	N	64	67	67	67	67	67	67	67	67	67	67	67	67	67
HerfSpec	Pearson Correlation	0,106	,318(**)	0,053	,286(*)	-,279(*)	0,190	-,327(**)	0,058	0,096	,254(*)	1	,409(**)	0,153	0,055
	Sig. (2-tailed)	0,406	0,009	0,671	0,019	0,022	0,124	0,007	0,638	0,440	0,038		0,001	0,216	0,657
	N	64	67	67	67	67	67	67	67	67	67	67	67	67	67
EstFounPC	Pearson Correlation	-0,009	,417(**)	-0,239	,527(**)	0,094	-0,084	-,492(**)	,603(**)	,359(**)	,251(*)	,409(**)	1	,669(**)	,588(**)
	Sig. (2-tailed)	0,941	0,000	0,051	0,000	0,449	0,497	0,000	0,000	0,003	0,040	0,001		0,000	0,000
	N	64	67	67	67	67	67	67	67	67	67	67	67	67	67
ShUniGr	Pearson Correlation	-0,024	,552(**)	-,358(**)	,671(**)	,253(*)	-0,050	-,497(**)	,509(**)	,632(**)	0,023	0,153	,669(**)	1	,784(**)
	Sig. (2-tailed)	0,852	0,000	0,003	0,000	0,039	0,687	0,000	0,000	0,000	0,851	0,216	0,000		0,000
	N	64	67	67	67	67	67	67	67	67	67	67	67	67	67
NUniv	Pearson Correlation	-0,018	,319(**)	-,506(**)	,455(**)	0,212	-0,052	-,365(**)	,405(**)	,607(**)	0,154	0,055	,588(**)	,784(**)	1
	Sig. (2-tailed)	0,886	0,008	0,000	0,000	0,086	0,676	0,002	0,001	0,000	0,213	0,657	0,000	0,000	
	N	64	67	67	67	67	67	67	67	67	67	67	67	67	67

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

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Table B. 3   Correlation Matrix of Variables Used in 2000-2008 Model

Variable	Statistic	GDPPCG	IGDPPC	LabForP	DepPC	TPubExp	TIncInvPC	PRD	HerfConc	NThPC	NOZPI	HerfSpec	EstFounPC	ShUniGr	NUniv
GDPPCG	Pearson Correlation	1	-.597(**)	-0.193	-.402(**)	-0.113	-.333(**)	.427(**)	-0.075	-0.007	-0.085	0.026	-0.017	-.242(*)	-0.092
	Sig. (2-tailed)		0.000	0.102	0.000	0.342	0.004	0.000	0.530	0.951	0.475	0.826	0.885	0.039	0.439
	N	73	73	73	73	73	73	73	73	73	73	73	73	73	73
IGDPPC	Pearson Correlation	-.597(**)	1	.293(**)	.787(**)	.270(*)	.333(**)	-.643(**)	0.190	.260(*)	.260(*)	0.143	.419(**)	.564(**)	.292(**)
	Sig. (2-tailed)	0.000		0.008	0.000	0.015	0.002	0.000	0.089	0.019	0.019	0.202	0.000	0.000	0.008
	N	73	81	81	81	81	81	81	81	81	81	81	81	81	81
LabForP	Pearson Correlation	-0.193	.293(**)	1	.453(**)	0.154	0.069	-.277(*)	-0.098	-0.116	-0.179	0.138	0.208	0.079	-0.110
	Sig. (2-tailed)	0.102	0.008		0.000	0.169	0.543	0.012	0.384	0.302	0.111	0.219	0.063	0.485	0.328
	N	73	81	81	81	81	81	81	81	81	81	81	81	81	81
DepPC	Pearson Correlation	-.402(**)	.787(**)	.453(**)	1	.374(**)	.253(*)	-.652(**)	.340(**)	.438(**)	.499(**)	0.147	.564(**)	.750(**)	.497(**)
	Sig. (2-tailed)	0.000	0.000	0.000		0.001	0.022	0.000	0.002	0.000	0.000	0.191	0.000	0.000	0.000
	N	73	81	81	81	81	81	81	81	81	81	81	81	81	81
TPubExp	Pearson Correlation	-0.113	.270(*)	0.154	.374(**)	1	.380(**)	-0.113	0.115	.276(*)	0.196	-0.134	.227(*)	.408(**)	0.212
	Sig. (2-tailed)	0.342	0.015	0.169	0.001		0.000	0.316	0.306	0.013	0.080	0.232	0.041	0.000	0.057
	N	73	81	81	81	81	81	81	81	81	81	81	81	81	81
TIncInvPC	Pearson Correlation	-.333(**)	.333(**)	0.069	.253(*)	.380(**)	1	-0.084	0.185	0.071	0.080	-0.086	0.057	0.175	0.173
	Sig. (2-tailed)	0.004	0.002	0.543	0.022	0.000		0.455	0.098	0.530	0.479	0.443	0.615	0.119	0.123
	N	73	81	81	81	81	81	81	81	81	81	81	81	81	81
PRD	Pearson Correlation	.427(**)	-.643(**)	-.277(*)	-.652(**)	-0.113	-0.084	1	-0.111	-.251(*)	-.244(*)	-.329(**)	-.227(*)	-.462(**)	-.229(*)
	Sig. (2-tailed)	0.000	0.000	0.012	0.000	0.316	0.455		0.322	0.024	0.028	0.003	0.041	0.000	0.040
	N	73	81	81	81	81	81	81	81	81	81	81	81	81	81
HerfConc	Pearson Correlation	-0.075	0.190	-0.098	.340(**)	0.115	0.185	-0.111	1	.268(*)	.530(**)	0.033	.310(**)	.395(**)	.896(**)
	Sig. (2-tailed)	0.530	0.089	0.384	0.002	0.306	0.098	0.322		0.015	0.000	0.768	0.005	0.000	0.000
	N	73	81	81	81	81	81	81	81	81	81	81	81	81	81
NThPC	Pearson Correlation	-0.007	.260(*)	-0.116	.438(**)	.276(*)	0.071	-.251(*)	.268(*)	1	.684(**)	0.011	.429(**)	.680(**)	.562(**)
	Sig. (2-tailed)	0.951	0.019	0.302	0.000	0.013	0.530	0.024	0.015		0.000	0.921	0.000	0.000	0.000
	N	73	81	81	81	81	81	81	81	81	81	81	81	81	81
NOZPI	Pearson Correlation	-0.085	.260(*)	-0.179	.499(**)	0.196	0.080	-.244(*)	.530(**)	.684(**)	1	0.045	.631(**)	.714(**)	.786(**)
	Sig. (2-tailed)	0.475	0.019	0.111	0.000	0.080	0.479	0.028	0.000	0.000		0.687	0.000	0.000	0.000
	N	73	81	81	81	81	81	81	81	81	81	81	81	81	81
HerfSpec	Pearson Correlation	0.026	0.143	0.138	0.147	-0.134	-0.086	-.329(**)	0.033	0.011	0.045	1	0.069	0.010	0.070
	Sig. (2-tailed)	0.826	0.202	0.219	0.191	0.232	0.443	0.003	0.768	0.921	0.687		0.539	0.932	0.532
	N	73	81	81	81	81	81	81	81	81	81	81	81	81	81
EstFounPC	Pearson Correlation	-0.017	.419(**)	0.208	.564(**)	.227(*)	0.057	-.227(*)	.310(**)	.429(**)	.631(**)	0.069	1	.566(**)	.474(**)
	Sig. (2-tailed)	0.885	0.000	0.063	0.000	0.041	0.615	0.041	0.005	0.000	0.000	0.539		0.000	0.000
	N	73	81	81	81	81	81	81	81	81	81	81	81	81	81
ShUniGr	Pearson Correlation	-.242(*)	.564(**)	0.079	.750(**)	.408(**)	0.175	-.462(**)	.395(**)	.680(**)	.714(**)	0.010	.566(**)	1	.621(**)
	Sig. (2-tailed)	0.039	0.000	0.485	0.000	0.000	0.119	0.000	0.000	0.000	0.000	0.932	0.000		0.000
	N	73	81	81	81	81	81	81	81	81	81	81	81	81	81
NUniv	Pearson Correlation	-0.092	.292(**)	-0.110	.497(**)	0.212	0.173	-.229(*)	.896(**)	.562(**)	.786(**)	0.070	.474(**)	.621(**)	1
	Sig. (2-tailed)	0.439	0.008	0.328	0.000	0.057	0.123	0.040	0.000	0.000	0.000	0.532	0.000	0.000	
	N	73	81	81	81	81	81	81	81	81	81	81	81	81	81

** . Correlation is significant at the 0.01 level (2-tailed).
* . Correlation is significant at the 0.05 level (2-tailed).

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