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## The importance of endogenous capacities and government support in the resilience of regions

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# **The importance of endogenous capacities and government support in the resilience of regions**

**Ayda Eraydın**

## **INTRODUCTION**

The increasing frequency of recessionary shocks following the deregulation of the financial and economic system in the 1980s has had significant impacts on regional growth. Different regions respond in different ways to recessionary shocks and the following recovery periods, and this has triggered an increasing interest in the subject of *regional economic resilience*. There have been multiple positive conceptualisations of regional resilience (Brand and Jax, 2007; Pike *et al.*, 2010; Davoudi, 2012; Bristow, 2010; Christopherson *et al.*, 2010; Foster, 2007; Hudson, 2010; Pendall *et al.*, 2010), as well as several empirically descriptive studies (Chapple and Lester, 2007 and 2010; Davies, 2011; Fingleton *et al.*, 2012; Hill *et al.*, 2008 and 2011; Martin, 2012; Simmie and Martin, 2010). That said, these studies have far from resulted in a well-established discourse related to the definition and central features of resilient regional systems (Eraydın and Taşan-Kok, 2013).

There are also studies to operationalise the resilience concept for use in regional analyses.. Most existing empirical studies have scrutinized recessionary shocks as a disturbance to regional growth trajectories (Fingleton *et al.*, 2012; Simmie and Martin, 2010; Hill *et al.*, 2008; Gerst, Doms and Daly, 2009), and in general, explore the responses of regions to recessionary shocks. Fingleton *et al.* (2012) and Martin (2010) were interested in finding out the impact of recessionary shocks on UK regions, while Davies (2011) examined how and why the resilience of regional economies varied among European countries. Hill *et al.* (2008 and 2011) studied 361 metropolitan statistical areas in the united states, and made case studies of six cities (Charlotte, Cleveland, Detroit, Grand forks, Hartford, Seattle) in order to find out the effects of shocks on employment and gross metropolitan product. The study by Gerst, Doms and Daly (2009) was more specific, concentrating only on IT centres, while Chapple and Lester (2007 and 2010) defined two frameworks defining regional resilience: first, the change in equilibrium (the shift from one category to another), and second, the change in the path-dependent development patterns (reversing path dependency). There are also studies that focused on evolutionary paths of regions connected to the ongoing economic changes at the global and national level (Pendall *et al.*, 2007; Swanstrom *et al.*, 2009). Swanstrom *et al.* (2009) studied resilience of regions under housing foreclosures, Pendall *et al.* (2010) during immigration influx and foster (2007) under both economic recession and other local dynamics shaped by the changing external conditions. Similarly, Hervas-Olivier *et al.*, (2011) tried to cover both exogenous and endogenous shocks in their analysis on North Staffordshire ceramics industrial district. Moreover, several studies discussed future prospects of regions and their resilience by exploring the endogenously developed assets of the regions, their reactive capabilities and adaptive capacities. Clark, *et al.* (2010: 123) provided empirical analysis on the character and evolution of regional economies and their relative position in the national and global markets.

These studies help to identify the attributes that allow regions to be prepared for, respond to and recover from unexpected disturbances, in other words, the major determinants that make one region more resilient than another region. However, they concentrate on the attributes of resilience with respect to the endogenous capacities of regions, but give less attention to support provided by local and central governments. There is limited attention provided to government policies and support in the resilience of regions, although it is the responsibility of governments to define policies and measures in response to the ongoing changes and global and national recessions (Christopherson, 2010).

This paper tries to discuss why are some regions better able to overcome the negative conditions resulting from recessionary shocks and adapt to the new conditions, and what are the important endogenous capacities and government support provided by government in the resilience of regions in Turkey. The resilience of regions is very important in Turkey, which experienced several recessionary shocks in the recent past. In order to explore these questions, this paper makes an analysis of the level of resilience of Turkish regions to recessionary shocks, and aims to identify the both capacities and policy measures that can explain the distinctive performances of these regions (26 NUTS II regions).

The paper is organised as follows: Following the introduction, in the first section of the paper, a brief summary is made of the main attributes of resilient regions. The second section introduces the case study to identify the different responses of Turkish regions to recessionary shocks and recovery in the Turkish economy. The third section is devoted to analysing the attributes and determinants of resilience of Turkish regions; defining the ones important in regions falling under different resilience categories. Finally, the Conclusion presents the policy implications of the findings.

## **ENDOGENOUS CAPACITIES OF RESILIENT REGIONS**

How a region responds to disturbances is a complex outcome of its characteristics, but also its ability to respond to the sources of a recessionary shock (Fingleton *et al.*, 2012; Martin, 2010). In this paper, reconsidering the original definitions of resilience and the main characteristics of resilient regions referred to in literature (Berkes *et al.*, 2003; Holling, 1973, 1996 and 2001; Folke, 2006; Gunderson, 2000) namely endogenous capacities of regions. Endogenous capacities are central in explaining the resilience of a region. The attributes of endogenous capacities that are important for regional economic resilience can be listed under two paths: the factors important that are important in its adaptive capacity and the determinants of a region's ability to respond, namely the available resources of regions.

It is assumed that adaptive capacity or the ability to cope enables a region to withstand or bounce back from external shocks (Briguglio, 2009). According to Pike *et al.* (2010), adaptability can explain a form of resilience that is maybe necessary to cope with unforeseen futures. In general, a regional economy with a robust adaptive capacity is more likely to be resistant to a recessionary downturn, or in the case of it being severely impacted, it is more likely to recover quickly (Martin, 2010).

What are the key factors affecting the adaptive capacity of a region? First, debates around this issue have attempted to answer whether it is specialisation or diversification that better promotes growth and adaptive capacity (Hill *et al.*, 2011; Glaeser *et al.*, 1992;

Harrison et al., 1996; Henderson, 2003). While diversification as a source of adaptive capacity finds more supporters in literature, diversified specialisation is a new notion that warrants attention (Pike et al., 2010). According to Martin (2010), all things being equal, a diverse regional economic structure often provides greater resistance to shocks than does a more specialised structure. In general, diversification versus specialisation is discussed with reference to the industrial base. Lee (2012) and Christopherson *et al.* (2010) claim that a diversified economic base that is not over-reliant on a single industry is important in the building of a resilient region, in that different industries have different sensitivities to economic downturns, changes in export markets, shifts in terms of trade and, more importantly, functions to spread risks to different types of activities. However, the nature and sectors involved in such a specialisation define whether a highly specialised regional economy is more sensitive to cyclical downturns than a diversified regional economy (Turok, 2009). Navarro-Espigares *et al.* (2012) claim that existence of large service sectors (both private and public) provides greater economic resilience to regional economies. Fingleton *et al.* (2012) support this view, indicating that a region that is specialized in manufacturing can be expected to be less resilient than a region dominated by services.

Second, the composition of economic activities is another issue that has received increasing attention. While Bramwell et al. (2008) pinpoint the resilience of high technology clusters, Treado and Giarratani (2006) claim that traditional cluster formations can also serve as a source of economic resilience. Moreover, recent literature focuses on sectorial interrelatedness (Martin, 2010; Potter and Watts, 2012) and industrial branching (Boschma and Frenken, 2009). Martin (2010) argues that how a regional economy reacts to recession depends on the degree of sectorial interrelatedness that can exist in a diversified structure, while there are also studies that emphasise the importance of factors connected to the economic structure, such as those related to technology and knowledge, the share of new goods and services, and the innovativeness and ownership pattern of the existing economic activities. Chapple and Lester (2007; 2010) claim that regions in which technology and knowledge-based work are witnessing rapid growth exhibit greater resilience. Strengths in the factors that create a learning region, and as Christopherson *et al.* (2010) emphasise, a strong regional system of innovation, are stated as essential for regional resilience (Cooke *et al.*, 2012). Moreover, previous literature has emphasised that resilient regions are those in which firms can introduce new goods or services for export, have access to new technologies for the production of such goods and services (Duranton and Puga, 2001).

Third, the available resources of regions are also important in their ability to respond to and recover from economic crisis, and these have been grouped under different headings in existing literature: infrastructure, education facilities, human capital, entrepreneurship and financial resources. Previous literature emphasises that a region's performance during cyclical volatility is connected strongly to its public and private infrastructure (Hill et al., 2011; Christopherson *et al.*, 2010), while a modern infrastructure has also been defined as an important factor of resilience (Jayaraman, 2004). According to Hill (2009), the condition of both the private and public capital infrastructure and a match between an area's urban form and modern transportation needs are important determinants of regional resilience. Similarly, Blumental, Wolman and Hill (2009) discuss the importance of the age of the transportation infrastructure and stock, claiming that areas with older infrastructure are less likely to be resilient. Besides the physical infrastructure, educational facilities are important in the building of resilient regions, with the connection of successful universities to excellence networks being essential for the generation of human capital (Bramwell et al., 2008). Similar to the endogenous growth theory, regional resilience literature has

emphasised the importance of a skilled, innovative and entrepreneurial workforce (Christopherson *et al.*, 2010; Hill *et al.*, 2011). It identifies the availability of human capital and skills of a region's workforce as one of the major drivers of growth (Glaeser and Sainz, 2004; Glaeser *et al.*, 1995; Gottlieb and Fogarty, 2003). The entrepreneurial culture of a region is another factor that has been mentioned as critical for capacity building in regional economies (Bramwell *et al.*, 2008; Williams and Vorley, 2014). Finally, literature has also emphasised the role of financial resources in the promotion of regional or community resilience. Bank deposits per capita is used as one of the major indicators of available financial resources, while Brugiglio *et al.* (2008, p.18) suggest several indicators of financial resources in the RESILIENCE INDEX they developed, namely 'fiscal deficit to GDP ratio, inflation rates and the external debt-to-GDP ratio'.

Fourth, heavy reliance on export earnings, high export and import concentration and instability of exports of goods can be listed as some of the negative features of regions that have been defined in previous studies (Jarayaraman, 2004; Briguglio, 2009), while Hudson (2010) also considers a growing incorporation into global patterns as a major threat to regional resilience. There are also studies, such as Pickles and Smith (2011), which identify high exports rates as a source of adaptive capacity. In general, regions that are specialised in mature products are more vulnerable (Feyrer, Sacerdote and Stern, 2007), although Bathelt *et al.* (2011) found that firms in traditional manufacturing industries were not as strongly affected by financial crises as expected. It has often been stated that economic structure plays a key role in shaping a region's vulnerability or resistance to shocks. Martin (2010), citing Conroy (1975), says that a particular mix of economic activities and the relationships and interdependencies between them can influence the reaction of a region's economy to recessionary disturbances and fluctuations.

## **THE ROLE OF GOVERNMENT POLICIES AND SUPPORT**

Although existing literature has come up with endogenous capacities and features of resilient regions, governance and institutional factors have largely been ignored in existing debates (Davies, 2011; Hassink, 2010; Pike *et al.*, 2010). According to Hill *et al.* (2008), resilient regions are those with the institutional capacity to make rapid transitions, and are particularly important in economic downturns due to their ability to mitigate the negative effects (Davies, 2011). Swanstrom *et al.* (2009) claim that even the most resilient metropolitan areas cannot adequately address the crisis on their own, as state policies have the ability to expand (or contract) the potential for local resilience.

Good governance and state policies are considered of paramount importance in the adaptive capacity of a region (Jayaraman 1998; Briguglio, 2009), with the nation state playing a key role in the transfer of different types of resources, especially those of a fiscal nature. In a study of six metropolitan areas in the United States, Swanstrom *et al.* (2009) found that the most resilient metropolitan areas had a history of collaboration between the public, private and non-profit sectors. According to this study, the most resilient metropolitan areas were proficient in their ability to alter organisational routines, garner additional resources and collaborate within and between the public, private and non-profit sectors. These assets are defined as a kind of institutional memory and permanence by Bailey *et al.*, (2008 cited in Pike, 2010:68), and are defined as central to the construction and nurturing of adaptive capacity in a region.

In several studies, specific policies have been emphasised. For example, in Duval *et al.* (2007), policies related to the labour markets are deemed important in building capacity to respond to economic shocks, while Christopherson *et al.* (2010) highlight fiscal policies and a supportive financial system. Lebel *et al.* (2006), on the other hand, underline the role of polycentric and multi-layered institutions. Foster (2007) raised another issue, being the ability of political authorities to put in place effective planning and implementation strategies in response to disruption.

## **THE IMPORTANCE OF RECESSIONARY SHOCKS ON REGIONAL ECONOMIC PERFORMANCE IN TURKEY**

In order to define framework of the study, in this section of the paper the crisis and recovery periods experienced in Turkish economy since the 1980s and the main factors, both external and domestic, important in stimulating them are identified.

Turkey has become more prone to economic volatilities beginning from the 1980s, after it strengthened its links to the global economy. During the growth process of the deregulated economy, both the increasing vulnerabilities due the integration to the global financial system and global value chains besides structural problems of the domestic economy provoked the crisis conditions. The economic polices at that period, on the other hand, were not efficient enough to prevent or reduce the negative outcomes in a short period. Therefore, besides the short term ups and downs in growth rates, after a radical shift in economic policy from import substitution and protectionist to export oriented economic growth during 1978 to 1980, Turkish economy is experienced four major crises during the course of financial liberalisation; 1988-89, 1994 ve 1999-2001 and 2008-2010 economic crises.

The different external factors are quite important in the emergence of crisis conditions in Turkey. Kazgan (2012) defines five headings to describe the way the external factors affecting the Turkish economy; the sharp changes in negative terms of trade in major export goods, the devaluation of the currencies in competing or main export markets of Turkey, the recession in the major export markets, increasing global or regional interest rates and flow of short-term foreign capital. However, the domestic conditions were also important in these crises (Kazgan, 2008). These factors are can be grouped as the negative balance of payments, public domestic/foreign debt stock, the foreign debts of banks and private firms and the macro economic instabilities and the general the economic policies that are not able to overcome these negative structural character of the economy.

The factors that were defined as important on 1978-81 downturn and ve following three short-term crises by Kazgan (2008 and 2012) in her detailed studies are summarised in Table 1. Obviously, each of these factors, which varied substantial in consecutive crisis, has also different implications on regional growth performance.

**Table 1: The factors important for provoking economic crises in Turkey**

	External factors					Domestic factors				
	Economic recession in export markets	The negative terms of trade	Devaluation in major market or competing countries	Increase in interest rates	Outflow of short-term capital	Inefficient Economic policies	Negative balance of payments	Public debt	Debt of banks and private companies	Unstable macro economic conditions
1978-1981	**	**	**	**	**	**	**		**	**
1988-1989	*		*	*	*	**	**	*	**	**
1994	*		**	**	**	**	**	**	**	**
1999-2001	*	*		*	**	**		**	**	**

\*important

\*\*very important

Firstly, the economic recession in the export markets have been important in almost of crisis experienced in Turkey. The recession in export markets were obviously had important impacts on the regions specialised export oriented production. Similarly, the studies showed that the devaluation of currency in major export markets and/or countries with similar export products of Turkey, negatively affected the regions, which had been producing for global markets and integrated to global value chains. The importance of these two factors is quite important, since most of the export products are mature price-sensitive products with modest technological level. The outcomes on regional performance, however, varied substantially due to differences in export markets of different regions.

On the other hand, the increase in interest rates in global markets had destructive effects on Turkish macro economy. They created negative conditions both in 1994 and from 1998 to 2001 to in financing development and increased the debt burden of both public and private enterprises in almost all regions, although the share of entrepreneurs that had used foreign financial resources became important in the outcomes of such external factors. The outflow of foreign capital, which search for the most advantageous conditions from their shareholders all over the world, deteriorated the balance of payments and accelerated the economic downturn in almost all crisis periods identified above. This situation obviously has negative implications in almost all regions. The changes in terms of trade had been important with respect to petroleum prices. The rising petroleum prices in different years provoked the negative conditions in balance of payments in Turkish economy, which had indirect consequences on regional growth.

In general, it is possible to say that increasing deregulation made Turkish economy more vulnerable, similar to other countries. The external factors defined above had negative effects on the balance of payments, the vitality of the domestic market, the public and private debt stock, which led to economic instability. The economic policies that have to reduce and dilute the impacts of such policies, on the other hand, were not successful enough to cope with the conditions accelerated by these external factors. Moreover, the economic policies were not able to solve some structural problems of the domestic economy.

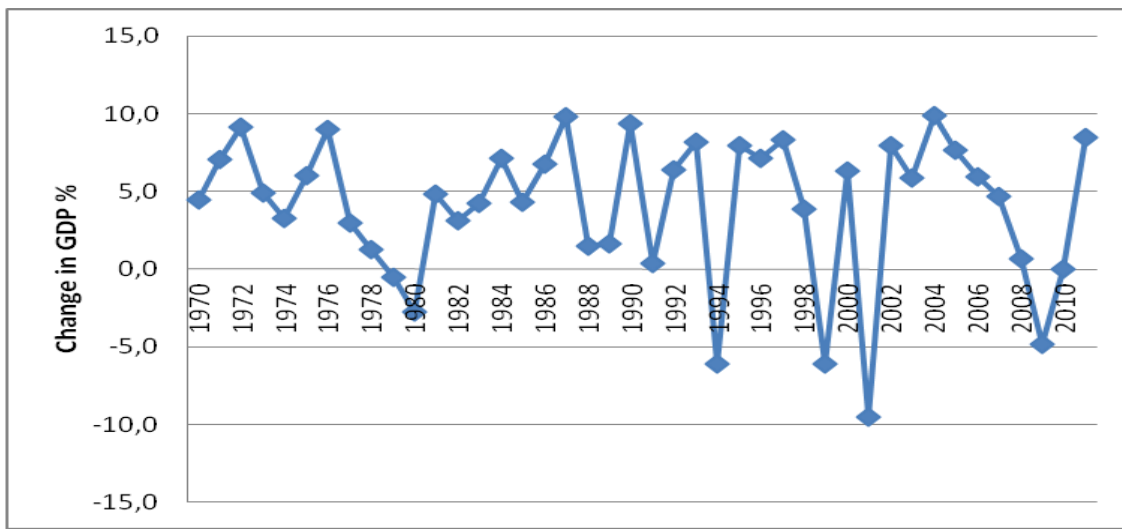
Among the domestic conditions however, the most important is the changing economic policies. As can be expected, the neoliberal economic policies have obviously more open to global crisis than the earlier periods in many countries all over the world, although at different levels due to structural differences.

In Turkey, the regions where foreign capital inflow is important, the ones with increasing exports share in commodities, and services are expected to get the benefits of access to international markets, while this situation may relatively more disadvantages to these regions be more by the crisis conditions. Moreover, the analysis of the Turkish economy shows that the measures to overcome the crisis conditions, especially financial austerity measures, can be more detrimental in certain advanced regions compared to the least developed ones. The reason is the least developed regions have limited financial and economic relations with the global markets, which make them less affected.

The balance in current transactions and public domestic/foreign debt stock are also important on regional growth, since they define the investment capability of private sector. The risk perception by private sector increases the cost of fixed investments and negatively affects the economic growth. On the other hand, the high public debt upsurges the interest rates both in domestic and international markets, which triggers crisis conditions and or the high rates of decline in the numbers of infrastructure projects that are vital for underdeveloped regions. Similarly, the macro economic instability affects all regions and makes it difficult the regional financial resources to turn towards different projects. This situation is especially very important for the regions that are really in need of new investment projects for growth.

In short it is possible to say that although the factors that create crisis conditions are important for all regions, their level of vulnerability has variegated level due to their existing structural characteristics, resources and adaptive capacities besides the public policies. In the coming sections, all of these factors and their importance for different regions in crisis and recovery periods are discussed in detail.

**Figure 1: Annual change in GDP % (fixed prices)**





## Resilience of Turkish regions to recessionary shocks

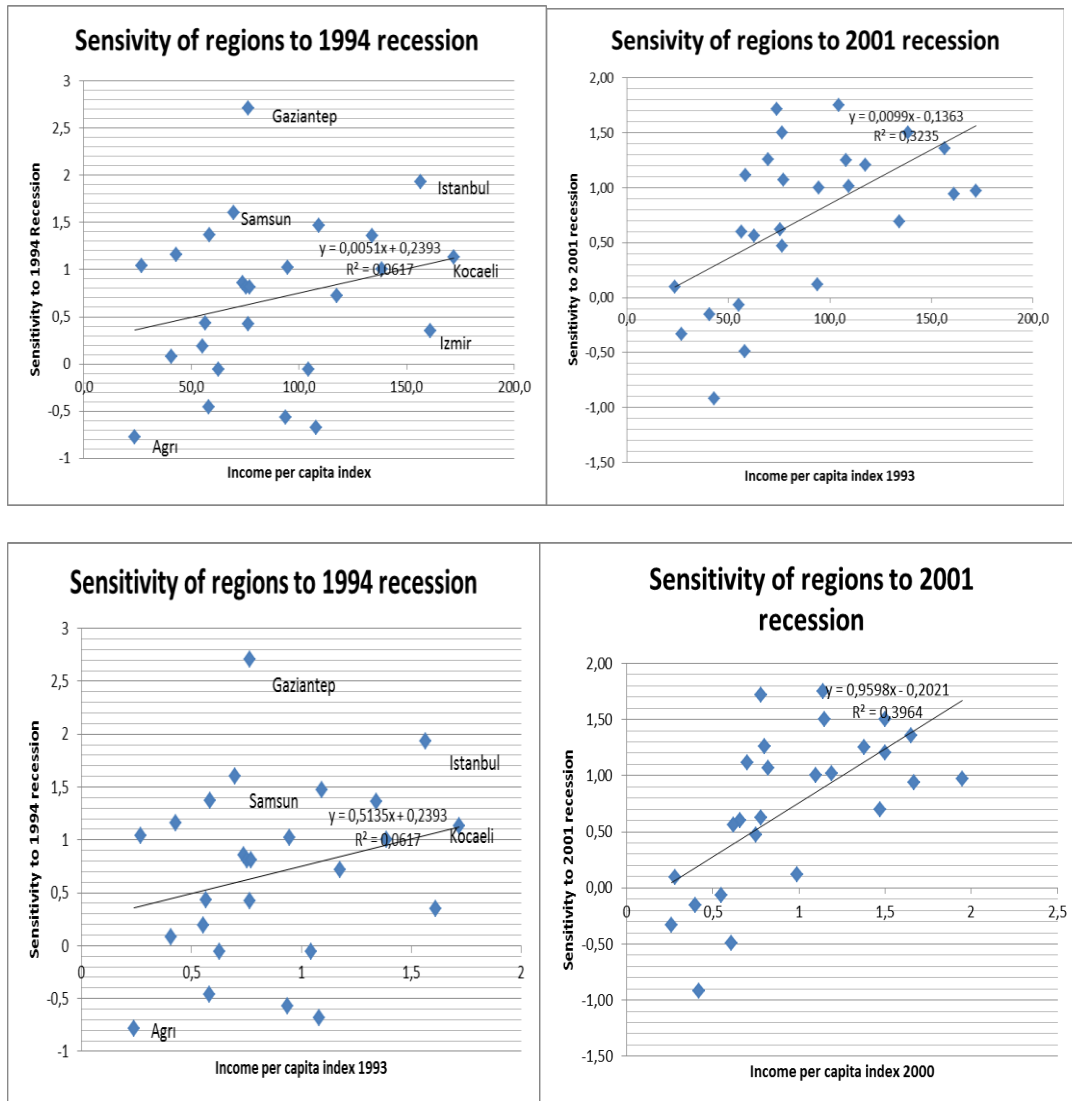
The recessionary shocks experienced in the national economy have obviously important implications on regional growth performances. In order to outline how different regions have been affected by recessionary shocks since the 1990s and how they recovered, first, the growth patterns of all regions in periods of both recession and recovery are calculated<sup>1</sup> (Table 3). It has not been possible to include the most recent economic cycle, from 2008 to 2014, in the analysis, due primarily to the lack of data for recent years (2012 and 2013), but also because of the change in the way regional output is measured. In the second step of the analysis, sensitivity indices are calculated for each region, defined as ‘the ratio of decline in output in a region to the respective decline in the country as a whole’, in which the performance of the national economy is used as a benchmark (Martin, 2010: 20). If the ratio for a given region is greater than national economy in the recession period, it shows high sensitivity to a recessionary shock, and if a region has a ratio of greater than national economy in the recovery period, it shows a greater potential to take advantage of favourable conditions to change its growth path. In contrast, figures below national economy indicate a lower sensitivity.

**Table 2: Change in GDP by region in recession and recovery periods (%)**

Regions	Change in GDP				Sensitivity Index*			
	Recessionary shocks		Recovery Period		Recessionary shocks		Recovery Period	
	1994	2001	1995-1998	2002-2008	1994	2001	1995-1998	2002-2008
Istanbul	-10,5	-10,16	8,49	10,55	<b>1,93</b>	<b>1,36</b>	<b>1,37</b>	<b>1,48</b>
Tekirdağ	-3,92	-9,02	7,93	7,24	0,72	<b>1,2</b>	<b>1,28</b>	<b>1,02</b>
Balıkesir	0,34	-13,13	2,83	6,76	-0,06	<b>1,75</b>	0,46	0,95
İzmir	-1,9	-7,04	4,67	5,07	0,35	0,94	0,75	0,71
Aydın	3,73	-9,36	6,4	4,03	-0,68	<b>1,25</b>	<b>1,03</b>	0,57
Manisa	-5,58	-7,49	5,78	4,21	<b>1,02</b>	1	0,93	0,59
Bursa	-7,42	-5,2	6,43	8,35	<b>1,36</b>	0,69	<b>1,04</b>	<b>1,17</b>
Kocaeli	-6,19	-7,28	7,56	5,25	<b>1,13</b>	0,97	<b>1,22</b>	0,74
Ankara	-5,46	-11,26	5,18	8,46	1	<b>1,5</b>	0,84	<b>1,19</b>
Konya	-4,68	-12,87	6,22	6,92	0,86	<b>1,72</b>	1	0,97
Antalya	3,09	-0,88	6,55	8,26	-0,57	0,12	<b>1,06</b>	<b>1,16</b>
Adana	-8,02	-7,61	4	2,71	<b>1,47</b>	<b>1,02</b>	0,65	0,38
Hatay	-4,43	-4,66	8,44	5,39	0,81	0,62	<b>1,36</b>	0,76
Kırıkkale	-4,4	-8,01	4,15	4,41	0,81	<b>1,07</b>	0,67	0,62
Kayseri	-2,35	-4,51	4,15	7,54	0,43	0,6	0,67	<b>1,06</b>
Zonguldak	-2,28	-11,27	9,39	5,32	0,42	1,5	<b>1,52</b>	0,75
Kastamonu	-7,5	-8,33	4,12	5,65	<b>1,37</b>	<b>1,11</b>	0,67	0,79
Samsun	-8,74	-9,44	6,93	5,66	<b>1,6</b>	<b>1,26</b>	<b>1,12</b>	0,79
Trabzon	2,5	3,68	3,47	5,93	-0,46	-0,49	0,56	0,83
Erzurum	-0,45	1,13	0,59	8,62	0,08	-0,15	0,1	<b>1,21</b>
Ağrı	4,26	-0,71	3,71	10,74	-0,78	0,09	0,6	<b>1,51</b>
Malatya	0,31	-4,23	1,94	5,35	-0,06	0,56	0,31	0,75
Van	-5,7	2,47	3,72	11	<b>1,04</b>	-0,33	0,6	<b>1,54</b>
Gaziantep	-14,8	-3,52	5,89	3,14	<b>2,71</b>	0,47	0,95	0,44
Şanlıurfa	-1,02	0,51	4,74	3,42	0,19	-0,07	0,77	0,48
Mardin	-6,34	6,88	7,3	6,62	<b>1,16</b>	-0,92	<b>1,18</b>	0,93
TURKEY	-5,46	-7,5	6,19	7,12	1	1	1	1

The analysis of growth rates and sensitivity indices reveals substantial differences in the responses of different regions to both recessionary shocks and the following recovery periods (Table 2). The sensitivity of regions to recessionary shocks are not correlated to the income per capita regions as the Figure 2 reveals.

**Figure 2: Sensitivity of regions to recessionary shocks by income per capita**



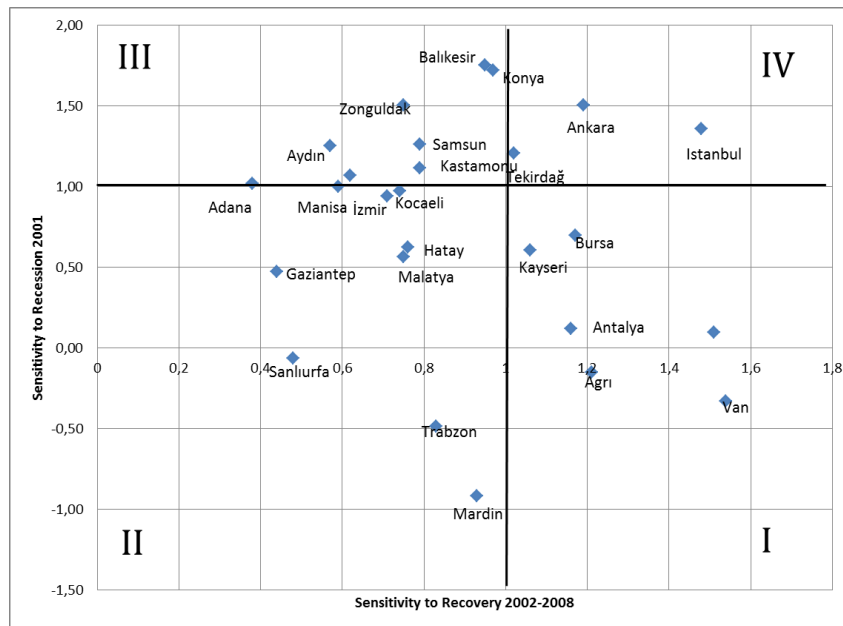
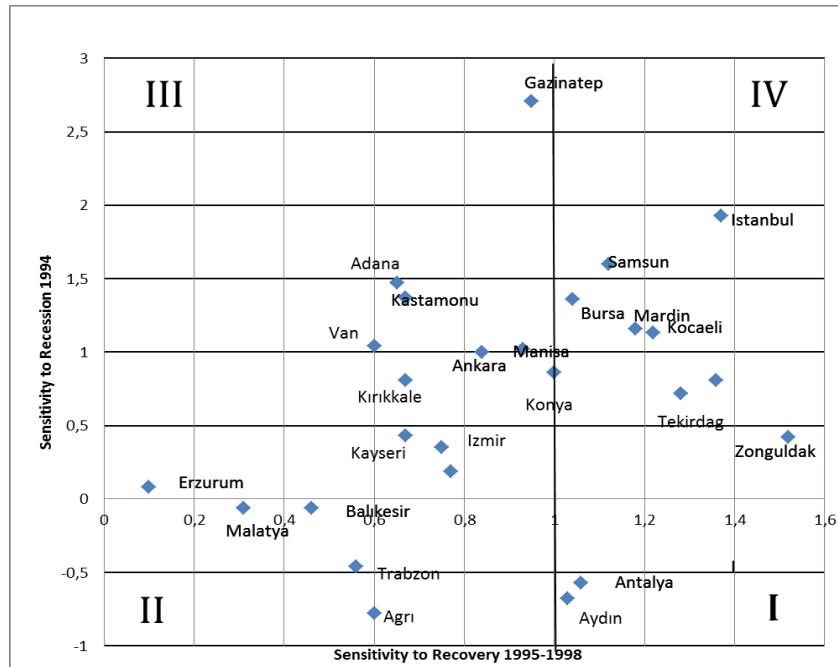
Therefore, these findings raise a major question. How can the differences in the responses of regions to recessionary shocks be categorised? In previous literature, various attempts have been made to categorise the performance of regions in periods of both recession and recovery, so as to explain the levels of resilience. Hudson (2010) suggests four interrelated dimensions to define how regional economies respond to recessionary or other types of shocks, namely resistance, recovery, re-orientation and renewal. Hill *et al.* (2008:4), on the other hand, identifies three types of region based on their behaviour in the event of shocks. A 'shock-resistant' region is a region that is not thrown off its prior growth path when it encounters a shock; 'resilient' refers to a region that, when affected adversely by a shock,

returns to at least its prior growth path within a relatively short period; and finally, a 'non-resilient' region is one that does not return at least to its prior growth path. Chapple and Lester (2010) define four categories of region based on their resilience, namely stagnant, faltering, thriving and transforming, based upon a comparison of the start and end status of regions being below or above average, and the growth of employment before and after a recessionary shock.

In this study of Turkish regions, four regional resilience typologies/categories are defined with the help of figures that measure the sensitivity of a region to changes in national output in periods of both recession and recovery. Namely Prospering, Shock-resistant, Non-resilient and Resilient-Transforming.

The distribution of regions among the four categories defined above (Figure 3) reveals some interesting regional features. Firstly, a large number of regions are categorised as *prospering*, being not directly effected by recessionary shocks, and were able to grow faster than the national economy in the post-recession periods. Although, the regions that fall under this category differ from one period to another, Antalya, as the most important international tourism destination in Turkey, achieved an increase in prosperity in both periods and has sustained a high rate of economic growth since the mid-1990s. The regions in the second category, *shock-resistant*, were not as badly affected by the economic shock as the national economy, but different from those in the first category, their growth rates in the post-recession period stayed below that of the national economy. These regions, although not experiencing significant declines in output, were unable to take advantage of the opportunities that existed in the post-recession periods. The largest number of regions fell under this category (9 out of 24 in 1994 and 2001), five of which could be consistently defined in this way, including Izmir, the third largest metropolitan region in Turkey. The other regions in this category present substantial differences in their economic structures and feature specialisations in different fields. The regions in the other two categories were more sensitive to recessionary conditions. Those in Category III, *non-resilient regions*, were deeply affected by recessionary shocks, suffering from shrinking economies, while also revealing an inability to adapt to the new conditions in the post-recession period, leading to only limited improvements in their economies. It is interesting to note that many regions that are highly specialised in the manufacturing sector fell under this category, such as Manisa, which boasts a high share of hi-tech employment and patents per capita. The number of regions in this category was less in 1994 recession, but the number grew considerably during the economic volatility witnessed between 2001 and 2008. The final category (Category IV) denotes *resilient regions*, which experienced an economic decline due to the recessionary shocks, but achieved high economic recovery, exceeding even the rates seen in the pre-recession period. Istanbul, Turkey's largest metropolitan region and the engine of the development of the Turkish economy, placed under this category in both of the economic cycles studied in this paper. In the economic cycle of 2000–2008, Ankara, the second largest metropolitan region; and Tekirdag, the region into which the Istanbul manufacturing industry expanded, also fell under the category of resilient regions.

**Figure 3: Performance of regions in recession and recovery periods in comparison to national averages**



### Determinants of Resilience

In this section of the paper an analysis is introduced that is based upon two major questions that will test the three hypotheses defined earlier: Which endogenous factors differ significantly among the regions in different resilience categories? Do the government

policies and measures are important to separate the regions in different categories of resilience?

A Discriminant Function Analysis (DA) is used to investigate the differences between groups based on the attributes of the 26 regions, indicating which attributes contribute most to group separation. The Discriminant Function Analysis technique is able to identify accurately the linear combination of attributes, known as canonical discriminant functions (equations), which contribute the most to group separation. In the analysis introduced in this paper, the DA function uses a region's value scores on the predictor variables to define which category the region belongs. The intention in this discriminant analysis is to explore and explain group membership. Due to the lack of data on regional attributes, the analysis covers only the 2001–2008 period.

In the first step of the analysis, the variables that explain endogenous capacities of regions are defined. In this context in order to identify the adaptive capacity of each region, seven variables are used (Table 3). The diversity of the economic sectors in the region is measured using the Herfindahl Index,<sup>ii</sup> while to measure specialisation in the manufacturing sector, Krugman's Specialisation Index<sup>iii</sup> is used. As discussed earlier, there are contradicting views on the consequences of diversity and specialisation on the resilience of regions, although existing literature in general asserts that diversity is more important than specialization in coping with crisis. That said, specialisation in high technologies (in terms of both employees and output) is defined as a positive asset of a region to resist crises and recover in the post-recession period, along with innovative capacity, which is without doubt defined as important for the resilience. Christopherson *et al.* (2010) discuss that regions in which innovation is rife can be less affected by crisis conditions and can recover rapidly following the crisis conditions, and in this study, the numbers of patents per capita (including utility models) is designated as a determinant of innovativeness. Another variable used in the analysis is value added per worker, which has been defined as a proxy of productivity in a regional economy, as high productivity rates are expected to have a positive impact on the adaptive capacity of a region.

The other group of variables are related to the availability of resources, capabilities and skills in a region. The share of university graduates in the total population over the age of 22 and the share of technical school graduates among the students in the same age group are used to put a figure to available regional human capital. The capacity for entrepreneurship, which is expected to facilitate the recovery of a region, is represented by the share of entrepreneurs in total working population. Lastly, in order to define the financial resources of a region, bank deposits per capita is used. According to previous literature, the regions with high deposits per capita are able to better resist recessionary shocks and grow faster in the recovery periods.

The third group of variables that define endogenous capacities of regions are dependency on imports and dependency on exports. These variables indicate the vulnerabilities of the regions. In several studies (see Briguglio, 2009), high import and export per capita values are accepted as an indication of the openness of a regional economy to external threats and global economic volatilities. Especially in periods of recession, regions with higher export and import figures are expected to be negatively effected by external economic conditions

The variables that define endogenous capacities of regions are expected to separate the regions with low and high levels of resilience, since they represent the main sources of the 2001 recessionary shock.

In this study, we are interested in to find out the importance of government policies and support in enhancing a resilient regional structure. Several variables (see Table 3) are used to assess whether government policies and measures are significant in separating regions in different resilience categories, two of which are public investment per capita, and incentives provided to firms. In order to define the level of non-financial support to local entrepreneurs, another variable is defined, namely, the number of parcels provided to entrepreneurs in industrial estates per capita. Credit per capita provided by public banks is used as a proxy for the financial contribution of the central governments regions to the financial markets. The last variable is the share of people in possession of green cards, which indicates the level of government subsidies to those in need of social assistance. This variable, indicating the number of unemployed and people in need of public aid, is an obvious measure of the low resilience of a region. Table 3 presents variables used in the discriminant analysis, with values taken from 2000, the year before the recessionary shock.

**Table 3: Attributes and variables used in analysis**

	Definition	Variables	
ENDOGENOUS CAPACITY	Diversity	Herfindahl diversity index-(economic sectors)	
	Productivity	Value added per capita in manufacturing industry (TL)	
	Specialisation	Krugman's specialisation index-(manufacturing)	
	High technology sectors	Share of high tech-manufacturing in total manufacturing employment %	
		The share of high tech firms in total firms %	
	New firms	New firms per capita	
	Sectorial composition	The share of employees in industry in total employment (%)	
	Innovativeness	Number of patents and utility models per capita	
	Human capital	Share of university graduates in population over 22 (%)	
		Share of students in technical education in students in same age group %	
	Entrepreneurial culture	The share of entrepreneurs in total employment (%)	
		Share of women entrepreneurs in total women employment (%)	
	Economic resources	Bank deposits per capita (TL)	
	Dependence on imports	Import per capita (US dollars)	
Importance of export markets	Exports per capita (US dollars)		
GOVERNMENT POLICIES AND MEASURES	Public investment	Public investment per capita (TL)	
	Infrastructure investment	The share of high quality roads in total roads in the region %	
	Supportive financial system	Total value of projects that received incentive certificates per capita TL)	
	The support for industrial firms	Land (number of parcels) provided in industrial estates	
	Dependency to credits provided by governments	Industrial, commercial and tourism credits per capita by public banks (TL)	
	Social policies	The share of population with green cards (%)	

### Findings of the Analysis

Since there are four categories of resilient regions, namely: (I) Prospering, (II) Shock-resistant, (III) Non-resilient and (IV) Resilient-Transforming (IV), the Discriminant Analysis defines three functions in the model. The analysis showed (Table 4) that Function 1 explains 73.8% of the total variance, while Function 2 explains 18% and Function 3, 8.2% of the total. Wilks' lambda, which is a measure of how well each function separates cases into groups, is significant for Function 1 through 3 ( $p=0.000$ ), and 2 through 3 ( $p=0.005$ ), but not

Function 3 (p=0.147). These findings indicate the discriminatory ability of Functions 1 and 2.

The analysis results are used to describe each category regions in terms of its profile, using the group means of the variables, namely centroids. Table 5, the Group Centroids table, shows that the resilient-transformative regions, being those with the ability to recover soon after a recessionary shock and achieve high rates of growth, scored very high on Function 1, while the other groups recorded negative and smaller values on this function. On this function namely, rich human and financial resources inducing innovativeness, the maximum difference is between resilient transforming and shock-resistant regions. What also important is the importance of two government support measures in the resilient transforming regions, namely Industrial, commercial and tourism credits per capita by public firms (million TL.) and Industrial land (number of parcels in industrial estates) provided by the central government to entrepreneurs. Shock-resistant and Non-resilient regions having high scores on Function 2 (non-resilient regions having negative values), define the opposite features of these two categories in entrepreneurship capacity in diverse economic activities. The prospering category, on the other hand, has a high score on Function 3; however, this function has no significant discriminatory power, as the previous tests indicated.

**Table 4: Structure matrix**

RESILIENCE CATEGORIES of REGIONS		Function		
		1	2	3
I-	Prospering	-,719	-,122	<b>1,046</b>
II-	Shock-resistant	-,930	<b>1,120</b>	-,344
III-	Non-resilient	-,314	<b>-1,027</b>	-,410
IV-	Resilient- Transforming	<b>4,861</b>	,337	,055

**Table 5: Functions at Group Centroids**

	Function		
	1	2	3
Bank deposit per capita (million TL)2000	,645(*)	0,162	-0,044
Share of university graduates in population over 22 (%)	,445(*)	0,181	0,157
Patent per million pop	,400(*)	-0,025	0,101
Industrial land (number of parcels in industrial estates)	,337(*)	0,065	0,006
Industrial, commercial and tourism credits per capita by public firms (million TL.)	,568(*)	0,249	-0,026
The share of population with green cards %	-,311(*)	-0,052	0,231
School enrollment ratio of technical Education (the share of students in technical education in the same age group)	,272(*)	-0,232	-0,163
Import per capita/US dollars	0,279	,351(*)	-0,206
The share of entrepreneurs in total employment	0,218	,306(*)	-0,178
Herfindahl index: Diversity	-0,092	-,237(*)	0,14

At the last step of analysis, the Classification Table (Table 6) is used to assess how well the discriminant function works. The results reveal that 80.8% of the original grouped cases are correctly classified, while the cross-validated classification, on the other hand, shows that 66.7% of the regions in category I, 87.5% of the regions in Category II, 77% of the regions in category III and 100% percent of the regions in Category IV are correctly classified.

**Table 6: Classification Results**

CATEGORY	Predicted Group Membership				Total
	1	2	3	4	
1	4	2	0	0	6
2	1	7	0	0	8
3	1	1	7	0	9
4	0	0	0	3	3
1	66,7	33,3	,0	,0	100,0
2	12,5	87,5	,0	,0	100,0
3	11,1	11,1	77,8	,0	100,0
4	,0	,0	,0	100,0	100,0

### Evaluation of the Findings

The findings of the analysis reveal that resilient-transforming regions bear characteristics that set them apart from the other regions. The attributes of regions that separate the regions in Category IV from the others are; financial resources (bank deposits per capita); human capital (shares of university graduates and students in technical schools) and innovative capacity (patents per capita). The regions falling under this category, which are deeply affected by the recessionary shocks, can experience a rapid recovery by using available financial resources, human capital, innovation potential and the good infrastructure. The number of green cards per capita is a negative indication of resilience, corresponding to the presence of a high number of people living under an acceptable income. The findings show that the regions with low levels of people that need support is a separating factor of resilient regions than the others.

In terms of government support, the provision of cheap land for industrial firms and credits per capita by public banks (industrial, commercial and tourism credits) appear to be the important factors separating resilient regions from other categories. Although government support is expected to be evenly distributed, the amount of land allocated to certain regions may be higher due to the greater demand generated in the resilient-transforming category, corresponding to the major metropolitan areas and their extensions. It is interesting to see that public investment per capita, incentive systems designed to support new private production projects and infrastructure provided by the central and local governments (the proxy used is the share of high quality roads in total roads in the region %) are not important the resilient-transforming regions than the others. These findings show the need to re-evaluate carefully the regional development policies launched by the central government.



On the other hand, the share of entrepreneurs in total employment, import per capita and diversity are factors that separate shock-resistant regions from other categories. Entrepreneurship is one of the most important assets of shock-resistant regions, given importance of small companies to economic resilience. The ability of entrepreneurs and small businesses to be adaptable and flexible in the event of change is paramount to their capacity to absorb and respond to external shocks, which in turn has a positive impact on the resilience of their locality. In Turkey, due to relatively small size of production units, entrepreneurship capacity is found to be quite important as a source of economic growth (Eraydin and Armatli-Köroglu, 2005). The high levels of imports per capita defining shock-resistant regions can be explained with reference to the Turkish development model that has been adopted since the 1990s. While import per capita can create negative conditions in a recession, rapid recovery can be achieved when based upon import-oriented consumption. Diversity, on the other hand, is very strongly connected to shock-resistant regions. It is interesting to see that none of the government policies are important to separate shock-resistant regions than the regions in other categories.

The analysis shows that these three determinants separate also non-resilient regions from the other categories, but in this case in a negative way. Function 3 separates prosperous regions from others, however none of the variables are sufficiently exploratory to define this category.

## **CONCLUSIONS**

Turkey has experienced several recessionary shocks since the 1970s that were accelerated by global economic conditions. In a country like Turkey, where there is a high level of income inequality among regions, an analysis of the responses of regions to recessionary shocks and their performance in recovery are very important. Unfortunately, the regional growth and policy agenda of the past three decades has been unable to reduce regional disparities in Turkey and the existing policies ignored the importance of region-specific policies in enhancing the ability of regions to cope with changing economic conditions, both globally and domestically.

This paper aims an empirical exploration of the concept of regional resilience that discusses the importance of government policies and measures, by highlighting the performance of different regions during economic cycles. The findings can be considered useful in two respects: First, they reveal the need for scrutiny of the traditional development strategies that are increasingly being regarded as ineffective in the integrated and globalized world (Pike et al., 2006), while also indicating several fields in need of intervention and support for the enhancement of regional resilience. Second, the findings make a useful explanation of why a strategy that works in one region may not necessarily bring the same result in another. As Rodriguez-Pose (2013: 1101) highlights, institutional interventions 'cannot be done via a one size fits all policy framework or simplistic criteria for intervention'. Instead of applying similar strategies in different regions, a better starting point for the formulation of policies would be to understand why a certain region belongs to a certain category of resilience.

The findings, while pinpoint several particular policy areas that should be prioritised, they reveal the need for a review of existing institutions, policies and measures. First, they show the importance of policies that enhance human capital and provide higher and more technically advanced education facilities in building capacity, which leads to greater

resilience and ability in self-transformation. Providing potential and environment for innovation alongside policies that support innovative activities may help boost the transformation capacity of a region. They also underline the importance of financial resources and access to credits, but also the distribution of existing employment and income opportunities. The share of people with green cards in a region, as an indicator of poverty, offers a clear indication that besides economic resources, how these resources are distributed is important.

However, in order to obtain a clearer picture, complementary studies may be required that discuss the endogenous factors as well as policies and measures introduced by governments in regions falling under different resilience categories. A region's resilience to recession may change, taking a different form over time, due not only to differences in the cause and nature of the individual recessions, but also because of the potential for evolution in the factors and policies and measures that shape economic resilience. These studies will contribute to develop out the region specific policies, at least for regions that fall different categories of resilience, which may be more instrumental to overcome ongoing disparities among regions.

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#### ENDNOTES

<sup>i</sup> Previous literature has used different explanatory variables to measure the impact of recessionary shocks, although employment and output (GVA) are the most important. While MARTIN (2010) and NAVARRO-ESPIGARES et al. (2012) used both output and employment, in many studies, analyses have been based on employment figures<sup>i</sup> (DAVIES, 2011; FINGLETON et al., 2012; SIMMIE and MARTIN, 2010), although there are also studies that use such variables as entrepreneurship (GLAESER et al., 2012) or foreclosures in the housing market (SWANSTROM et al., 2009).

<sup>ii</sup> The Herfindahl Index is given below, where  $S_i$  defines the number of economic activities in the region,  $e_{si}$  the employees in sector  $s$  and  $e_{i\text{total}}$  the working population in the region.

$$H_i = \sum_{s=1}^{S_i} \left( \frac{e_{si}}{e_i} \right)^2$$

<sup>iii</sup> The level of specialisation in the manufacturing sector is defined by the Krugman Specialisation Index. In the formula below  $K^k(t)$  is Krugman's specialisation index (takes a value between 0 and 2),  $V_i^k(t)$  is the share of industry  $k$  in the total manufacturing sector of region  $i$  and  $V^k(t)$  the share of sector  $k$  in total manufacturing industry of the nation.

$$K^k(t) = \sum abs / V_i^k(t) - V^k(t)$$