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Labor Market Effects of State Universities in Turkey

Türkiye'deki Devlet Üniversitelerinin İşgücü Piyasası Etkileri

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Abstract: Higher education plays a vital role in the regional development of countries. As the principal institutions of higher education, universities can create externalities through knowledge transfers and expenditures. These externalities enhance regional development via different channels. This paper particularly considers the labor market channel and focuses on the relationship between local universities and regional labor market performances in Turkey. To this end, the microdata of the 2006 Household Labor Force Survey executed by the Turkish Statistical Institute and the Student Selection and Placement Center statistics are employed, and empirical analyses are done through logit regression models. As a result, it is found that a positive relationship between both the existence and qualities of local universities and labor force participation. Therefore, increased labor force participation is expected to lead to higher regional income and enhanced long-term development.

Keywords: higher education, local universities, labor force participation, regional development

Özet: Yükseköğretim, ülkelerin bölgesel kalkınmasında önemli bir rol oynamaktadır. Yükseköğretimin temel kurumları olan üniversiteler, bilgi transferi ve harcamaları yoluyla dışsallıklar yaratabilirler. Bu dışsallıklar, farklı kanallar aracılığıyla bölgesel kalkınmayı artırmaktadır. Bu makale özellikle işgücü piyasası kanalını ele almakta ve Türkiye'deki yerel üniversiteler ile bölgesel işgücü piyasası performansları arasındaki ilişkiye odaklanmaktadır. Bu amaçla Türkiye İstatistik Kurumu tarafından yürütülen 2006 Hanehalkı İşgücü Araştırması mikro verileri ile Öğrenci Seçme ve Yerleştirme Merkezi istatistikleri kullanılmış ve logit regresyon modelleri ile ampirik analizler yapılmıştır. Yerel üniversitelerin hem varlığı hem de nitelikleri ile işgücüne katılım arasında pozitif bir ilişki olduğu tespit edilmiştir. Artan işgücü katılımının uzun vadede daha yüksek bölgesel gelire ve gelişmiş kalkınmaya yol açması beklenmektedir.

Anahtar Kelimeler: yükseköğretim, yerel üniversiteler, işgücüne katılım, bölgesel kalkınma

1. Introduction

The importance of the regional development problem does not change much, even if the economic policies substantially vary in developing and developed countries over time. Balanced regional development is a desirable objective in the national policy agendas of many countries.[1] To this purpose, the market mechanisms alone are usually considered inadequate to enhance the development level of lagging regions. So, the government's initial role is inevitable and crucial in these regions. Public investments in infrastructure and superstructure aim to provide primary needs and create the necessary business environment. These range from major infrastructures (e.g., electricity, roads, irrigation canals) to other institutions (e.g., hospitals, schools). However, especially in developing countries, the regional distribution of these investments can be skewed. This unequal distribution creates disparities initially. Then, it is expected for the region to develop by itself, either using its resources or attracting the attention of entrepreneurs and investors for profitable opportunities.

Nevertheless, this process does not run smoothly and simultaneously in all regions due to relative disadvantages of the regions (e.g., climatic or geographical handicaps, the inadequacy of skilled labor, the cost of unskilled labor, and security). These suppress the externalities of public investments and deepen regional economic disparities. Moreover, the reflections of these inequalities on other development indicators also signal various problems.

[1] It is commonly accepted that regional inequalities hinder to provide economic development and wealth in a given country. Regional inequalities primarily indicate an inefficient economy (Filiztekin, 2008).

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Government initiative again plays a leading role and makes additional complementary investments for new infrastructures and institutions to foster externalities. Local state universities are one of those investments. The contributions of universities to regional development are multi-dimensional. While their educational outcomes are generally discussed within the context of human-capital formation,[2] some economic effects they created are also considered mainly in the literature, namely knowledge and expenditure effects.[3] These empower the roles of universities in the local areas.

Moreover, they contribute to regional attractiveness and provide the region's openness to the rest of the world. They also contribute to new firms' formation (i.e., university-industry collaborations) and increase the qualifications of the local laborers.[4] Therefore, various channels or mechanisms are possible for universities' contributions to regional development.

Turkey is worth investigating the links between higher education and regional development because of its specific regional dynamics. The West-East disparity is a distinct historical and structural feature of Turkey.[5] The West side of Turkey is more developed and affluent than the East.[6] However, East regions do still experience a lack of public investments such as schools and hospitals. Even if these investments are made in those regions, the inadequacy of skilled labor hinders the persistence of essential services. Therefore, there are noticeable gaps between East and West regions regarding household income levels and living standards. Under these conditions, internal migration from East-rural to West-metropolitan areas becomes inevitable. Herein two significant problems arise. One of them is the inadequate absorption capacity of West labor markets, so the integration problems of these migrants arise in the West urban areas.

Another problem is about the remaining population in the East. Although the migrants keep their connection with rural, this is insufficient to transfer their enough income. In addition to the flow of unskilled labor, brain drain also does happen in big cities. Therefore, potential skilled labor has gone for good and all. This situation creates a structural dispersion between the West and East labor markets. At that point, local universities are expected to resurgence the regional labor markets and eliminate severe skill and income gaps. In one sense, universities are partially and implicitly assigned for the convergence aim in economic and social-cultural issues.

However, the first question here is through which channel or mechanism higher education contributes to regional development in Turkey.

This study focuses on the regional labor markets as a source of disparities, and the contribution of universities is assessed from that perspective.[7] Many studies consider universities' innovation or technology creation features for regional development in the literature.[8] These objectives seem not feasible for Turkey as of 2006 but are expected to be in the long run.[9] Nevertheless, in the short-run, higher education in the local universities has a critical outcome, partially to graduate a skilled and productive labor force. Overall, the existence of the universities is expected to improve the labor market performance of the region, i.e., the labor force participation rate (LFPR) or employment rate should be higher, and the unemployment rate should decrease over time. The second question arises: Which factors should be considered in the higher education system to take the signals of those improvements? Is the quality versus quantity of universities determinant for high labor force market performance?

This study argues that the existence and the number of universities are more significant at the initial stages of development. However, the quality of universities gets increasingly important when the region reaches a certain level of income per capita and wealth. The underlying thought for this gradual reasoning is the effects of externalities in the short and long run. In the first stage, universities can create an immediate expenditure effect by constructing the campus buildings, buying office equipment, and employing officials and academic and administrative personnel. These generate demand in the local commodity and service markets and income. Then, as the university improves, quality will become the primary concern in the second stage because the persistence of skilled labor generation in the regional context depends on the university's production of qualified knowledge (research) and skilled labor. These are the long-term aims.

In line with these arguments, the objectives of this paper are to

- explore the contributions of higher education to regional development.
- outline the contribution channels of higher education to regional development.

[2] See Polat (2017).

[3] See Newlands (2003).

[4] The changing patterns of skill demand in the labor markets foster the roles of universities, especially in terms of lifelong learning processes.

[5] For spatial and historical reasons, see Doğruel and Doğruel (2003, p. 6).

[6] According to a World Bank (2008) report, regional disparities run mainly along the east-west axis in Turkey. "Advanced" regions (those with an average income per capita higher than 75 percent of the national average) include Marmara, Aegean, Mediterranean, and Central Anatolia, while the remaining three regions, Eastern Anatolia, Southeastern Anatolia, and Black Sea, are classified as "lagging" (WB 2008, p. 29).

[7] Differences in labor productivity are the key determinants of regional disparities, accounting for 88 percent of differences in per capita regional incomes in Turkey (WB 2008, p. 30).

[8] See Benneworth & Fitjar (2019), Goddard et al. (2012), Harrison & Turok (2017), and Thomas et al. (2021).

[9] For the recent studies, see Baycan & Arkali Olcay (2021), Ranga et al. (2016), Ünlü et al. (2022), and Ünsal (2019).

- focus on local universities' effects on the regional labor markets in Turkey.

- empirically analyze the relationship between the local universities and the labor force participation in Turkey.

Accordingly, this paper explores the impacts of local state universities on the regional labor market outcomes estimating the existence and quality of universities on the labor market participation behaviors of individuals through logit regression models by using the microdata of the 2006 Household Labor Force Survey executed by the Turkish Statistical Institute and the Student Selection and Placement Center statistics.

The paper constitutes the following components: Section 2 provides a short review of the literature on the role of higher education in regional development and brings some empirical examples forward. Section 3 presents an overview of the regional labor market disparities in Turkey. Section 4 presents the data and methodology. Section 5 displays the empirical results. Finally, the paper ends with conclusions.

2. The Role of Higher Education in Regional Development – A Literature Review

Many authors have underlined the several roles of universities in regional development from different perspectives.[10] Generally, higher education is accepted as a significant social, economic, and cultural development indicator. So it is because expectations from universities are not only limited to educational outcomes but also related to their economic, social, cultural, and even political effects. However, accurate measuring for all these effects is impossible.[11] Therefore, studies in the literature with different approaches benefit from some proxies and focus on one or two dimensions of development. This section makes a short survey of that literature and gives some empirical examples of the prominent roles of higher education institutions in regional development. On the other hand, studies on regional labor market disparities are reviewed here to make their roles more explicit.

Akbari (1996) asks whether the provincial effect on earnings arises because of interprovincial differences in educational quality or working environment. He utilizes Mincer's standard human capital earning model (1974) to measure systematic provincial earning differences among individuals and concludes that persistent earnings differences among Canadian provinces may be primarily due to differences in the working environment among provinces. Besides, the author compares various measures of educational quality for Canadian provinces, but he could not find any significant pattern for these measures.[12]

Cassia & Colombelli (2008) focus on the role of universities as the primary sources of knowledge spillovers and explores the effects of universities on individual firms' growth. They concentrate on UK public companies in the Alternative Investment Market (AIM)[13] and use Gibrat's Law of Proportionate Effects Model in their empirical analyses. Authors find that universities' knowledge input and output are essential determinants of the growth of entrepreneurial firms listed on the AIM.

Chakrabarti and Lester (2004) point out the alliances between firms and universities in their study, namely "Regional Economic Development: Comparative Case Studies in the US and Finland." Authors emphasize the increasing budgetary challenges of universities and argue that universities search for ways to expand their roles. Thus, their research questions deal with the changing role of universities in knowledge generation, diffusion, and implementation. Comparing four technological universities from the US and four technical universities from Finland, they observe that universities play significant roles in local and regional economic development. Their major implication is the necessity of policies considering the complexity and diversity of university-industry interactions.

However, the empirical evidence about the spillover effects of the research activities in universities and the reflection of these activities in the markets, and innovations, has a mixed record. Faggian & McCann's (2006) study for Great Britain finds little evidence in favor of direct spillovers between university research and regional innovation. Instead, they find that the primary role of the universities seems to be an attractor which brings potential high-quality undergraduate human capital into a region.

Although the importance of human capital is considered one of the major engines of regional development[14] without dispute, and higher education is seen as a critical determinant for the persistent performance of regional labor markets, some empirical studies can give unexpected results. In one of these studies, Di Liberto (2008), the connection between growth and human capital is studied within a convergence regression for the panel of Italian regions. According to a significant finding of the author, increased education seems to contribute

[10] See Bramwell & Wolfe (2008), Caniels & van den Bosch (2011), Cassia & Colombelli (2008), Charles (2001), Chakrabarti & Lester (2004), Çetin (2007), Dalğar (2009), Drucker & Goldstein (2007), Faggian & McCann (2006), Garrido-Yserte, R. & Gallo-Rivera, M. T. (2010), Peer & Parker (2016), Trippl, et al. (2015).

[11] Booth & Jarret (1976, p. 566) stated that there are some economic impacts of universities that are not measured by the models. These factors are, generally, long-range effects that are difficult, if not possible, to measure. For example, the measurement of the university's role in upgrading the region's manpower skills, or its role as an industrial location factor is not attempted. See also Vyrostova & Vyrost (2007).

[12] These measures are the salaries of elementary school teachers and per pupil expenditures by governments at the elementary school level but no significant patterns were found for these other measures (Akbari, 1996, p. 339).

[13] Authors describe this market as a secondary market dedicated to young and growing companies in both science and non-science based industries. They state that they investigated the growth determinants of 231 listed firms which have gone public during the period going 1995 to 2006 (Cassia & Colombelli, 2008, p. 455, 459).

[14] See Florida et al. (2008).

to growth only in the South side of Italy. Interestingly enough, Di Liberto (2008) finds that only primary education in the South is important, while tertiary education has a negative effect on regional growth. Therefore, the author concludes that Italian regions are still far from being able to capture the positive returns from higher levels of education.

Drucker & Goldstein's (2007) article has a different aim than others. They review the methodologies and approaches used to examine the influence of research universities on regional economic development outcomes. In their review, the authors concentrated on the methodological advantages and shortcomings of four significant research designs: single-university impact studies, knowledge production functions, and cross-sectional or quasi-experimental designs. Their main implication is that university activities, particularly knowledge-based activities such as teaching and basic research, have substantial positive effects on various measures of regional economic progress.

In addition to evidence for the direct effects of universities on regional development, the labor market channel is also considered in several studies as a source of regional economic disparities (OECD, 2005). Some studies are reviewed below.

Estevao (2002) analyzes the regional labor market disparities in Belgium. He initiates the study by observing that regional labor market discrepancies have been widening in Belgium in the last two decades, which is evident within particular demographic groups. Estevao (2002) holds the lagging areas responsible for the poor labor market performance relative to the EU, and he thinks these areas will be the reasons for the non-achieving of Lisbon Submit's objectives.

Additionally, Estevao (2002) summarizes the main policy issues in Belgium: how best to attract firms to high-unemployment areas and labor to low-unemployment areas. The author links regional differences in the labor markets to poor job matching, wage compression, and low labor mobility. He uses a structural VAR analysis, showing that Belgium tends to be less sensitive to labor demand shocks.

A similar work is done by Luo (1997) for Croatia. In that study, the author focuses on the role of individual and regional structural characteristics. Using labor force survey data, Luo (1997) explores the labor market performance in Croatia at the national and regional levels. He reaches the results that one's characteristics (age, education, gender) and where s/he works play a role in his or her employment and earnings. In other words, regional differences in employment and earnings are reduced to a large extent when accounting for differences in individual characteristics. According to the simulation analyses in the paper, improving human capital endowment and adjusting the labor market structure are critical to rebalancing regional development and enhancing total welfare in Croatia.

Oyelere (2007) is one of the most interesting studies in regional labor market disparities literature. In this paper, the author investigates the claims of geographical region disparities in labor market outcomes using survey data from Nigeria between 1996 and 1999. The study's null hypothesis is that there are no significant regional differences in labor market outcomes in Nigeria. According to the results, similar mean incomes across regions in Nigeria were found, and returns to education were not statistically different for Northern and Southern Nigeria. Given these results, Oyelere (2007) states that the null hypothesis cannot be rejected. This means there is no evidence of significant disparities in labor market outcomes across regions in Nigeria. This is a surprising finding for an African country.

In the subsequent section, regional labor market disparities in Turkey are considered in depth. The Household Labor Force Survey (HLFS) data for 2004-2008 and the news releases of TURKSTAT regarding both provincial and regional labor market statistics will be employed for descriptive analyses of the next section. Throughout the study, all regional analyses are based on the Nomenclature of Units for Territorial Statistics (NUTS) 2 level. Then, in the fifth section, the empirical analyses considering local universities' existence and qualities will be done to describe regional labor market disparities. Therefore, the role of universities on a given indicator of regional labor market performances is expected to be clarified.

3. Regional Labor Market Disparities in Turkey

The existence of regional labor market disparities is historically evident in Turkey. In this section, these disparities are described and assessed using labor market indicators employing recent TURKSTAT data at the NUTS 2 level.[15]

Annex 2 summarizes the primary labor market indicators of 26 statistical regions in Turkey. According to that table, the most populous region is İstanbul.[16] Kastamonu has the lowest non-institutional population, with 721 thousand of persons among NUTS 2 level regions. This order does not change much for the working-age population (15+). However, the ranking of regions for the components of this potential active population is considerably different.[17] The proportion of the labor force to the working-age population is the highest in the Trabzon region (61.1 percent) and the lowest in the Mardin region (30.7 percent).[18]

[15] The statistical regions of Turkey at NUTS 2 level are shown in Annex 1 1.

[16] Moreover, Istanbul has the highest population density with 2.444 persons. This information is based on the results of 2008 population census. (TURKSTAT, Press Release, 26.01.2009)

[17] According to the definition of ILO, the working age population is divided into persons in the labor force and persons not in the labor force.

[18] See Annex 4 for the regional patterns from 2004 to 2008.

In detail, Rize (66.3 %), Gümüşhane (65.4 %), and Artvin (62.5 %) were the provinces having the highest labor force participation rates, respectively, and the provinces having the lowest labor force participation rates were Diyarbakır (26.9 %), Siirt (27.2 %) and Şırnak (29.8 %) within 95 % confidence intervals.[19] In three metropolises, İstanbul, Ankara, and İzmir, labor force participation rates are also below the country average, even if their working-age population shares are above the average.[20]

Annex 2 also comprises the employed and unemployed persons' data by region. According to the levels, İstanbul is the region that employs the highest number (18.5 % of overall employment). However, the relatively highest employment rate is in the Trabzon region, and the lowest is in the Mardin region. Therefore, the unemployment rate is the highest in the Mardin region (17.4 %). The regional ranking of this ratio is mixed and does not provide to make a clear-cut dichotomy for geographical location.

In Annex 3, the abovementioned three leading labor market indicators are decomposed by sex for 26 regions. Although the Trabzon region has the highest participation rate in total, the highest male participation rate belongs to the Antalya region. The lowest rate for males is in Şanlıurfa. However, in female participation rates, Trabzon is the leading region. That means the Trabzon region partially owes its first place in participation rates to its female labor force. A further investigation reveals the sources of this situation clearly. 40 % of all employed persons in that region are females, and nearly 79 % work in agriculture. Moreover, 64 % of these female agricultural laborers are unpaid family workers. Another interesting region within that context is İstanbul. Although İstanbul is Turkey's most economically active region, female labor force participation is substantially low there. The reasons behind this fact primarily lie in the labor market integration processes of migrants. Especially women, who care for their families and deal with only agricultural activities in the rural East, find themselves at home in the urban West. Nevertheless, this subject is still open to discussion and needs further research.

Unemployment rate statistics in Annex 3 also give essential signals for the disparities of regional labor market performances. Beyond doubt, unemployment is a common problem for all regions of Turkey. In this regard, Filiztekin (2007) notes that widening regional gaps and persistent unemployment differentials while unemployment is increasing at the national level. Mardin, Adana, and Gaziantep are the first three regions with the highest rates of total unemployment.[21] Adana and Gaziantep is the issue of concern at that point. Intuitively, both regions are expected to have economic vitality with high absorption capacity for unemployed persons. However, Adana has the highest female unemployment rate, and Gaziantep has the highest male unemployment rate among all regions. Two primary reasons for unemployment in the Adana region are migration inflows, mainly from East and South East Anatolian, and the sectoral transformation from agriculture to industry.[22] Another side, although the Gaziantep region has tried to resist the recent economic crisis with relatively high exportation, many industrial firms have decided to shut down due to financial constraints. This should be the primary reason behind the high male unemployment rate in the Gaziantep region. It seems that country-level economic problems affect them. Nonetheless, the unemployment problems of these two regions should be investigated considering specific regional dynamics.

To sum up, Turkey experiences severe labor market dispersions at both provincial and regional levels. Although some regions have transformation problems due to internal sectoral dynamics, some sort of impasses is characterized by nationwide problems.[23] Against these problems, it seems that the market mechanism cannot work perfectly, especially in economic downturns. Under these circumstances, governments need to bring additional measures to circumvent unemployment in the short run and to create persistent job opportunities in the long run. Here the appropriate matching of jobs with the qualifications of labor is crucial. Therefore, education gets more importance in the supply side of the labor market.[24] Even if not the unitary aims of higher education institutions are to graduate students for the labor market, they play a determinant role in students' orientation and educational attainments in getting the right job. Therefore, establishing state universities may ameliorate regional labor market performances in the short run and enhance regional development in the long run. The following section will be an empirical inquiry into these ascribed roles to the universities on the labor market performances and regional development.

4. Data and Empirical Method

So far, regional labor market disparities are described utilizing basic statistical tools retrieved from TURKSTAT, and regional labor market indicators of Turkey in the NUTS 2 level are highlighted. In this part of the study, a further step, an empirical investigation of the link between universities and regional development, is initiated, assuming the regional labor markets are sig-

[19] These data are cited from TURKSTAT, Press Release (22.12.2009), namely "Main Labor Force Indicators by Province, 2008". Rize, Gümüşhane, and Artvin are the provinces of Trabzon region. Siirt and Şırnak are of Mardin region. However, Diyarbakır is in the Şanlıurfa region in NUTS 2 level classification.

[20] See Annex 5 for some reason being not in the labor force.

[21] Ağrı is the region with the lowest unemployment rate. It owes this to its low female unemployment and wide agricultural sector (see Annex 6). 92 % of employed women are working in the agriculture.

[22] Despite the fact that female employment in the agricultural sector increased from 57 to 101 thousand persons between 2004 and 2008, female unemployment rates in that regions increased from 19.3 % to 21.3 %. This can be solely explained with an exogenous working age population shock, i.e. migration inflows.

[23] Economic activities still heavily have based on agriculture sector in some regions (see Annex 6).

[24] LFPR increases by high education level, especially for females in Turkey (see Annex 8 and 9).

Table 1. Sample Sizes by Region (Non-Student, 15+, NUTS 2)

NUTS2[a]	Freq.	Percent	NUTS2[a]	Freq.	Percent
TR10 (İstanbul)	39.050	12	**TR71** (Kırıkkale)	8.869	2,7
TR21 (Tekirdağ)	8.005	2,5	**TR72** (Kayseri)	9.399	2,9
TR22 (Balıkesir)	8.926	2,7	**TR81** (Zonguldak)	7.405	2,3
TR31 (İzmir)	18.190	5,6	**TR82** (Kastamonu)	7.605	2,3
TR32 (Aydın)	12.097	3,7	**TR83** (Samsun)	15.705	4,8
TR33 (Manisa)	21.111	6,5	**TR90** (Trabzon)	11.621	3,6
TR41 (Bursa)	16.397	5	**TRA1** (Erzurum)	7.475	2,3
TR42 (Kocaeli)	17.743	5,4	**TRA2** (Ağrı)	6.901	2,1
TR51 (Ankara)	15.487	4,7	**TRB1** (Malatya)	7.259	2,2
TR52 (Konya)	10.963	3,4	**TRB2** (Van)	8.886	2,7
TR61 (Antalya)	9.770	3	**TRC1** (Gaziantep)	8.673	2,7
TR62 (Adana)	14.800	4,5	**TRC2** (Şanlıurfa)	12.956	4
TR63 (Hatay)	11.618	3,6	**TRC3** (Mardin)	9.679	3
			Total	326.590	100

Source: HLFS Micro Data, TURKSTAT (2006)

a) Provinces in parentheses represent the region.

nificant channels for that. Therefore, universities' human capital formation roles are aimed at testing considering the supply-side indicators of labor markets. To this aim, the Household Labor Force Survey (HLFS) microdata of TURKSTAT and tabulated statistical data of the Student Selection and Placement Center are employed for 2006. HLFS microdata of TURKSTAT gives some essential characteristics of individuals randomly sampled among the non-institutional civilian population. So it just provides information for the individuals on the supply side of the labor market.

The samples used in empirical analyses consist of non-student people among the working-age population (15+) for each NUTS 2 level region (see Table 1). The total sample size is 326.590 individuals.

The major labor supply indicator, namely the labor force participation rate, substantially varies depending on sex in Turkey. The reason is the different determinants of LFP for males and females. Men are generally accepted as household heads and income earners; however, women are seen as homemakers and caregivers in the traditional Turkish family structure. As mentioned in the previous section, the degree of this traditional division of labor within households changes to regions. Therefore, the analysis of LFP needs a gender-sensitive approach. In this respect, samples of regions are separated into male and female subsamples (see Table 2). The number of males is 152.740, and females 173.850 persons in total. These subsamples are drawn from the non-student and working-age populations.

The methodology followed in the empirical analyses of this section is based on a discrete binary choice model, namely the logistic regression model. This model is appropriate because of the binary nature of the dependent variable in the analyses for labor force participation decisions. An individual decides to participate or not. Furthermore, this provides the flexibility to construct a model using cross-sectional data. The disadvantages of this methodology source from the doubts about sampling issues and omitted variables.[25] Nevertheless, it is convenient for the empirical framework of this study.

The model is specified as

$$[1] \qquad L = f(\alpha + \beta X) = 1/[1 + e^{-(\alpha+\beta X)}]$$

where L is labor force participation, X is the vector of determinants of L, α is a constant, and β is a coefficient vector. The list of independent variables is given in Annex 12. This list categorizes independent variables into individual, household, and regional characteristics. Individual characteristics give some basic personal information, namely sex, age, and education level. Household characteristics are related to the internal features and composition of households, e.g., household size and presence of children below 14 aged in the household. Finally, regional characteristics comprise region dummies and proxy variables for universities.

5. Empirical Results

Given the logit model and variables, two specifications are estimated, and marginal effects are computed from them.[26] First, the establishment of new local universities in 2006 is put into the model as a dummy variable (univestab06) and tested whether it is a statistically significant contributor to male and female labor force participation (see Table 3). According to the results presented

[25] See Drucker & Goldstein (2007, p. 34), Isserman et al. (1986, p. 561) for details.

[26] STATA (data analysis and statistical software) is used for all estimations. See Acock (2008), Hamilton (2004).

Table 2. Sample Sizes by Region and Sex (Non-Student, 15+, NUTS2)

NUTS2[a]	Frequency			NUTS2[a]	Frequency		
	Male	Female	Total		Male	Female	Total
TR10 (İstanbul)	18.867	20.183	39.050	**TR71** (Kırıkkale)	4.066	4.803	8.869
TR21 (Tekirdağ)	3.859	4.146	8.005	**TR72** (Kayseri)	4.362	5.037	9.399
TR22 (Balıkesir)	4.184	4.742	8.926	**TR81** (Zonguldak)	3.432	3.973	7.405
TR31 (İzmir)	8.697	9.493	18.190	**TR82** (Kastamonu)	3.571	4.034	7.605
TR32 (Aydın)	5.770	6.327	12.097	**TR83** (Samsun)	7.167	8.538	15.705
TR33 (Manisa)	10.014	11.097	21.111	**TR90** (Trabzon)	5.401	6.220	11.621
TR41 (Bursa)	7.879	8.518	16.397	**TRA1** (Erzurum)	3.408	4.067	7.475
TR42 (Kocaeli)	8.459	9.284	17.743	**TRA2** (Ağrı)	3.053	3.848	6.901
TR51 (Ankara)	7.350	8.137	15.487	**TRB1** (Malatya)	3.300	3.959	7.259
TR52 (Konya)	5.111	5.852	10.963	**TRB2** (Van)	3.717	5.169	8.886
TR61 (Antalya)	4.736	5.034	9.770	**TRC1** (Gaziantep)	3.939	4.734	8.673
TR62 (Adana)	6.894	7.906	14.800	**TRC2** (Şanlıurfa)	5.840	7.116	12.956
TR63 (Hatay)	5.311	6.307	11.618	**TRC3** (Mardin)	4.353	5.326	9.679
				Total	152.740	173.850	326.590

Source: HLFS Micro Data, TURKSTAT (2006)

a) Provinces in parentheses represent the region.

in Table 3, logit estimation results give positive signs for the "univestab06" dummy both in male and female subsamples. This means that establishing new universities in 2006 increases the probability of participation for both males and females in all regions. This is consistent with our early expectations. The primary reasoning behind that positive relationship is associated with the localization of these newly established universities. Although these higher education institutions are old parts of other prominent national universities, their independent establishments enable them to integrate with the local markets and strengthen the regional networks. As a result, they further contribute to the vitalization of the local economy. Despite the lack of a detailed analysis, it can be easily presumed that the expenditure effect at the initial stages of these universities is more dominant than the knowledge effect. However, this effect weakens over time, and the knowledge effect becomes more important than the expenditure effect. Therefore it is expected that the knowledge effect will be influential in the long-run development of regions and create new opportunities for potential labor supply.

Other independent variables also give expected signs after running the estimation. All age dummies are positive and statistically significant. In the sample of males, the likelihood to participate is the highest for the age interval between 25 and 29 with respect to the base category. However, for females, the highest probability is getting at ages between 35 and 39. This finding follows theory (inversed-U-shaped pattern for males and M-shaped pattern for females) and real-life experiences; because men enter into the labor force at younger ages than females. However, females' discrete entries persist in their later ages due to marriage and childbearing-rearing activities in their 20s' (see Annex 10).

Education-level dummies also give meaningful results. The highest logits are attained at the university graduation level for both males and females. On the other hand, there are two striking points in these results. One of them is the low marginal effect on males' high-school graduation. Indeed, this is not surprising when the education system and its perception of labor markets in Turkey are considered. This is because it is almost indifferent being graduated from high school or secondary school unless university graduation is not achieved in Turkey. Even a secondary school graduate participating in the labor force at his/her early age (14-15) is more advantageous than a high school graduate because of long experience. That anomaly makes the high school graduates discouraged and restrains them from participating. This can be the subject of further research. The second striking point is the marginal effect on females' university graduation level. It is the highest by far with respect to other categories. The nearest category is occupational school graduation. This means that higher education is the only way to guarantee higher participation for females (see Annex 9).

The findings for household characteristics seem to be consistent with the initial expectations. Although being married is an encouraging marital status for males, this is a deterrent factor for females. This is heavily due to the gender-biased distribution of within-household activities. According to the traditional Turkish family structure, men are dominant figures in households and are just responsible for earning income. However, women must do almost everything in the household. Under these circumstances, being double-labor for employed women is an irresistible situation. In line with these handicaps, being a household head for females is negatively related to participation behavior. Female-headed households are formed chiefly due to women's divorced or widowed status. There are

Table 3. Results of Logit Estimations and Marginal Effects by Sex (Specification 1)

Variables	Male		Female	
	lfp	mfx	lfp	mfx
age15_19	1.373***	0.140***	0.275***	0.0506***
	(0.0383)	(0.00242)	(0.0283)	(0.00551)
age20_24	2.306***	0.189***	0.499***	0.0954***
	(0.0363)	(0.00164)	(0.0229)	(0.00475)
age25_29	2.979***	0.227***	0.640***	0.125***
	(0.0371)	(0.00158)	(0.0220)	(0.00474)
age30_34	2.793***	0.218***	0.782***	0.157***
	(0.0382)	(0.00156)	(0.0226)	(0.00504)
age35_39	2.445***	0.201***	0.944***	0.195***
	(0.0372)	(0.00164)	(0.0229)	(0.00530)
age40_44	2.213***	0.194***	0.829***	0.168***
	(0.0328)	(0.00169)	(0.0215)	(0.00486)
primarysch	0.733***	0.108***	0.243***	0.0425***
	(0.0199)	(0.00294)	(0.0160)	(0.00283)
secondarysch	1.005***	0.120***	0.387***	0.0729***
	(0.0263)	(0.00250)	(0.0248)	(0.00503)
highsch	0.412***	0.0560***	0.427***	0.0812***
	(0.0273)	(0.00334)	(0.0252)	(0.00520)
occuphighsch	0.962***	0.112***	0.872***	0.181***
	(0.0309)	(0.00274)	(0.0275)	(0.00647)
univ	1.057***	0.120***	2.279***	0.510***
	(0.0301)	(0.00256)	(0.0274)	(0.00553)
married	0.748***	0.127***	-0.394***	-0.0711***
	(0.0267)	(0.00501)	(0.0162)	(0.00305)
hhhead	0.626***	0.103***	-0.297***	-0.0479***
	(0.0283)	(0.00495)	(0.0245)	(0.00369)
phhchildren0_14	0.545***	0.0812***	-0.466***	-0.0799***
	(0.0165)	(0.00242)	(0.0138)	(0.00234)
hhsize	0.037***	0.0056***	0.041***	0.0071***
	(0.00341)	(0.000516)	(0.00282)	(0.000487)
univestab06	0.123***	0.0188***	0.356***	0.0600***
	(0.0138)	(0.00212)	(0.0128)	(0.00209)
Constant	-2.193***	-	-1.880***	-
	(0.0377)		(0.0246)	
Observations	152740	152740	173850	173850

a) Standard errors in parentheses

b) *** p<0.01, ** p<0.05, * p<0.1

c) age45+, illiterate, not married, not hhhead, non-phhchildren0_14, not-univestab06 are base categories

Table 4. Results of Logit Estimations and Marginal Effects by Sex (Specification 2)

Variables	Male		Female	
	lfp	mfx	lfp	mfx
age15_19	1.370***	0.140***	0.298***	0.0554***
	(0.0383)	(0.00243)	(0.0282)	(0.00556)
age20_24	2.301***	0.190***	0.511***	0.0984***
	(0.0363)	(0.00164)	(0.0228)	(0.00477)
age25_29	2.973***	0.227***	0.648***	0.127***
	(0.0371)	(0.00158)	(0.0219)	(0.00475)
age30_34	2.786***	0.218***	0.785***	0.158***
	(0.0382)	(0.00156)	(0.0225)	(0.00504)
age35_39	2.441***	0.202***	0.938***	0.194***
	(0.0372)	(0.00164)	(0.0228)	(0.00529)
age40_44	2.210***	0.194***	0.825***	0.167***
	(0.0328)	(0.00169)	(0.0215)	(0.00485)
primarysch	0.735***	0.109***	0.234***	0.0411***
	(0.0200)	(0.00295)	(0.0161)	(0.00285)
secondarysch	1.007***	0.120***	0.365***	0.0687***
	(0.0263)	(0.00250)	(0.0248)	(0.00499)
highsch	0.412***	0.0560***	0.388***	0.0734***
	(0.0273)	(0.00335)	(0.0251)	(0.00513)
occuphighsch	0.965***	0.112***	0.845***	0.175***
	(0.0309)	(0.00274)	(0.0275)	(0.00643)
univ	1.051***	0.120***	2.213***	0.497***
	(0.0301)	(0.00258)	(0.0272)	(0.00562)
married	0.758***	0.129***	-0.380***	-0.0688***
	(0.0267)	(0.00502)	(0.0162)	(0.00305)
hhhead	0.617***	0.101***	-0.293***	-0.0477***
	(0.0283)	(0.00495)	(0.0246)	(0.00371)
phhchildren0_14	0.539***	0.0804***	-0.475***	-0.0817***
	(0.0165)	(0.00242)	(0.0138)	(0.00235)
hhsize	0.0379***	0.00572***	0.0462***	0.00803***
	(0.00342)	(0.000518)	(0.00281)	(0.000488)
univqual	0.0570***	0.00857***	0.0371***	0.00646***
	(0.0139)	(0.00208)	(0.0123)	(0.00214)
Constant	-2.140***	-	-1.682***	-
	(0.0371)		(0.0238)	
Observations	152740	152740	173850	173850

a) Standard errors in parentheses

b) *** p<0.01, ** p<0.05, * p<0.1

c) age45+, illiterate, not married, not hhhead, non-phhchildren0_14, not-univestab06, univqual<0.05 are base categories

two constraints against the participation of those women. First, they face social pressures, and second, generally, they get a non-labor income such as alimony or pensions. The presence of children aged below 14 in the household is another barrier to female participation. This is the natural consequence of the non-existence or inadequateness of kindergartens in public and private firms. Even if the market mechanism presents some opportunities, these are so expensive. Therefore reservation wages of females increase, so the probability of participation decreases. Another household characteristic is the household size. This is the unique continuous variable in all specifications. For both males and females, it is positive and statistically significant. Under economic constraints, this is the rational choice to participate in the labor market for both males and females, especially when household size enlarges.

After controlling the effects of the existence of local universities on labor force participation, it is time to control the quality measures of universities and whether it is a significant determinant for the participation behavior of males and females. These measures are generated by dividing the share of first preferences by the total preferences of placed students in an undergraduate program of a state university in 2006. So, a proxy quality measure is calculated for each university (see Annex 1). The threshold value for these calculated values is assumed to be 0.05 (5 %). Therefore, the regions with average quality measures below this threshold are coded by 0, and above this threshold are coded by 1 (univqual). Although these used quality measures are so crude, they are used as proxies to capture the demand for a state university, and so the quality.

According to the estimation results using these measures, "univqual" dummy gives positive and statistically significant coefficients for both males and females. This reflects an increase in the probability of participation behavior when a person lives in a region with a qualified university with respect to calculated quality measures.

The coefficients and marginal values for other independent variables show similar results to the first specification. Furthermore, individual and household characteristics align with the first estimation results. To sum up, both the existence of new universities and the qualities of all universities have significant importance on male and female LFPR of regions.

6. Conclusion

The regional economic disparities manifest themselves with GDP per capita and other indicators such as the labor force participation rate or unemployment rate. Depending on the performances of these labor market indicators over time, development patterns in the regional base are so much assessed in the literature. However, it is hard to decompose the determinants of these aggregate measures. In the theoretical literature, no clear-cut assumptions or models exist to estimate the contributions of different channels on regional development. For example, health, education, and culture are all development dimensions for a given region. So, empirical studies considering one of these channels generally employ the "ceteris paribus" assumption. This study is one of these empirical works. It focuses on the regional labor market disparities and explores the effects of universities on the labor force participation behavior of individuals while assuming other channels do not affect LFP. In doing that, econometric toolkits of a cross-sectional analysis are used to estimate the labor force participation functions controlling for the effects of universities.

According to the results of all estimations, the establishment of new universities in Turkey after 2006 is found to be a statistically significant determinant of labor force participation for the related regions. Here the question is whether this is economically significant. As mentioned in the previous sections, universities play an important role in regional development through their externalities. These externalities are namely knowledge and expenditure effects. Making an investment in a university in a lagging region, at first, creates an expenditure effect. Then, the knowledge effect takes an even more significant roles than the expenditure effect over time. It is so crucial in the formation of necessary human capital. In the medium and long run, the qualification of the labor force is critical to creating new profit opportunities and attracting investors' attention. This is in accordance with the options for strengthening regional policies in Turkey. A significant change in the economic structure of lagging regions is needed to reduce regional income disparities. Bridging the human capital gaps of regions can be a vehicle for this change, and it entails a shift for universities from fundamental national objectives to regional strategies.

In further stages, the qualities of universities become matter. A region with qualified local universities has more chance to attract potentially skilled labor and so the investments. The empirical results of this study verify that the labor force participation incentives of people increase if they are in a region with qualified universities, ceteris paribus.

The main policy implication of this study is to suggest establishing new local universities with well-defined missions and visions for the development of its host region. They should produce feasible projects for their city or region and improve their qualities until they become an attraction center.

Consequently, this study shows that public investments in local universities in different regions do not seem irrational in Turkey's case. Although regional labor market conditions and performances are open to several kinds of effects and supports, the importance of universities should be evaluated distinctly. They create new job opportunities, foster economic growth, and bring social and cultural dynamics into the regions.

Further research on this topic may employ the current data sets and empirically evaluate the impacts of local state universities on regional development over time. Since the number of universities has increased rapidly in the last two decades, an empirical impact evaluation will help make a sound cost-benefit analysis for public investments.

References

Acock, A. C. (2008). *A Gentle Introduction to Stata*. Texas: Stata Press.

Akbari, A. H. (1996). Provincial income disparities in Canada: Does the quality of education matter?" *The Canadian Journal of Economics*, *29*, Special Issue: Part 1, 337-339.

Baycan, T. & Arkali Olcay, G. (2021) Linking the performance of entrepreneurial universities to technoparks and university charac-

teristics in Turkey. *REGION*, *8*(1), 97–117.

Benneworth, P. & Fitjar, R. D. (2019) Contextualizing the role of universities to regional development: introduction to the special issue. *Regional Studies, Regional Science*, *6*(1), 331-338.

Bramwell, A. & Wolfe, D. A. (2008). Universities and regional development: The entrepreneurial University of Waterloo. *Research Policy*, *37*, 1175-1187.

Booth, G. G. & Jarrett, J. E. (1976). The identification and estimation of a university's economic impacts. *The Journal of Higher Education*, *47*(5), 565-576.

Caniels, M. C. J., & van den Bosch, H. (2011). The role of higher education institutions in building regional innovation systems. *Papers in Regional Science*, *90*(2), 271-286.

Cassia, L. & Colombelli, A. (2008). Do universities knowledge spillovers impact

on new firm's growth? Empirical evidence from UK. *International Entreprenural Management Journal*, *4*, 453–465.

Çetin, M. (2007). Bölgesel kalkınma ve girişimci üniversiteler. *Ege Akademik Bakış*, *7*(1), 217-238.

Chakrabarti, A. K. & Lester, R. K. (2004). Regional economic development: Comparative case studies in the US and Finland. *MIT Industrial Performance Center*, MIT-IPC-LIS-02-004.

Charles, D. (2001). Universities and regional development. *TSER Project*, Contract No: SOE1-CT98-1108.

Dalğar, H., Tunç, H., & Kaya, M. (2009). Bölgesel kalkınmada yükseköğretim kurumlarının rolü ve Bucak örneği. *Mehmet Akif Ersoy Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, Yıl: 1, Sayı: 1, Güz, 39-50.

Di Liberto, A. (2008). Education and Italian regional development. *Economics of Education Review*, *27*, 94–107.

Dogruel, F. & Dogruel A. S. (2003). Türkiye'de bölgesel gelir farklılıkları ve büyüme. In Köse A.H., Senses, F. ve Yeldan, E. (Eds.), *İktisat Üzerine Yazılar I: Küresel Düzen, Birikim, Devlet ve Sınıflar-Korkut Boratav'a Armağan*. İstanbul: İletişim Yayınları, 287–318.

Dogruel, F. & Karaman, F. N. (2008). The role of investments in universities and in airports on the regional convergence. *Topics in Middle Eastern and North African Economies* (Electronic Journal), *10*.

Drucker, J. & Goldstein, H. (2007). Assessing the regional economic development impacts of universities: A review of current approaches. *International Regional Science Review*, *30*(1), 20-46.

Estevao, M. (2002). Regional labor market disparities in Belgium. *IMF Working Paper*, No. 02-134.

EUROSTAT (2007). Overview maps of the NUTS and statistical regions of Europe," <http://ec.europa.eu/eurostat/ramon/nuts/pngmaps/tr2.png>

Faggian, A. & McCann, P. (2006). Human capital flows and regional knowledge assets: A simultaneous equation approach. *Oxford Economic Papers*, *52*, 475-500.

Filiztekin, A. (2007). Regional unemployment in Turkey. <www.ecomod.org/files/papers/486.pdf>

Filiztekin, A. (2008) Türkiye'de Bölgesel Farklar ve Politikalar. İstanbul: TÜSİAD, Yayın No: TÜSİAD-T/2008-09/471.

Florida, R., Mellander, C., & Stolarick, K. (2007). Inside the black box of regional development – Human capital, the creative class and tolerance. *Journal of Economic Geography*, *8*, 615–649.

Garrido-Yserte, R. & Gallo-Rivera, M. T. (2010). The impact of the university upon local economy: three methods to estimate demand-side effects. *The Annals of Regional Science*, *44*(1), 39-67.

Goddard, J., Robertson, D., & Vallance, P. (2012). Universities, technology and innovation centres and regional development: the case of the North-East England. *Cambridge Journal of Economics*, *36*(3), 609-627.

Hamilton, L. C. (2004). *Statistics with STATA*. Canada: Thomson, Brooks/Cole.

Harrison, J. & Turok, I. (2017) Universities, knowledge and regional development. *Regional Studies*, *51*(7), 977-981.

Isserman, A., Taylor, C., Gerking, S., & Schubert, U. (1986). Regional labor market analysis. In Nijkamp, P., *Handbook of Regional and Urban Economics*, 1, pp. 543-580.

Luo, X. (2007). Regional disparities in labor market performance in Croatia: The role of individual and regional structural characteristics. *World Bank Policy Research Working Paper*, No. 4148.

Newlands, D. (2003, 27-30 August). The role of universities in learning regions. Paper presented at the ERSA Congress, Finland, University of Jyvaskyla.

OECD Employment Outlook (2005). How persistent are regional disparities in employment? The role of geographic mobility. ISBN 92-64-01045-9.

Oyelere, R. U. (2007). Disparities in labor market outcomes across geopolitical regions in Nigeria: Fact or fantasy? *IZA Discussion Paper Series*, No. 3082.

Peer, V., & Penker, M. (2016). Higher education institutions and regional development: A meta-analysis. *International Regional Science Review*, *39*(2), 228–253. https://doi.org/10.1177/0160017614531145

Polat, S. (2017). The expansion of higher education in Turkey: Access, equality and regional returns to education. *Structural Change and Economic Dynamics*, *43*, 1-14.

Ranga, M., Temel, S., Ar, İ. M., Yeşilay, R. B., & Vardar Sukan, F. (2016). Building technology transfer capacity in Turkish universities: a critical analysis. *European Journal of Education*, *51*(1), 90-106.

Thomas, E., Faccin, K., & Asheim, B. T. (2021). Universities as orchestrators of the development of regional innovation ecosystems in emerging economies. *Growth and Change*, *52*(2), 770-789.

Trippl, M., Sinozic, T., & Smith, H. L. (2015) The role of universities in regional development: Conceptual models and policy institutions in the UK, Sweden and Austria. *European Planning Studies*, *23*(9), 1722-1740.

Ünlü, H., Temel, S., & Miller, K. (2022) Understanding the drivers of patent performance of University Science Parks in Turkey. *The Journal of Technology Transfer*, https://doi.org/10.1007/s10961-022-09929-x .

Ünsal, N. (2019). Technoparks in Turkey: A Descriptive Study. In: Amoroso, S., Link, A., Wright, M. (eds) Science and Technology Parks and Regional Economic Development. Palgrave Advances in the Economics of Innovation and Technology. Palgrave Macmillan, Cham.

Vyrostova, E. & Vyrost, T. (2007). Measuring the roles of universities in regional development. Paper presented at the Second Central European Conference in Regional Science – CERS, (pp. 1141-1149). Technical University of Kosice, Faculty of Economics

World Bank (2008) Challenges for regional development policy. *Turkey, Country Economic Memorandum*, Report No. 39194, <siteresources.worldbank.org/TURKEYEXTN/.../Volume_I_Final.pdf>

Appendices

Annex 1. Statistical Regions (NUTS 2 Level) and State Universities

Regions (NUTS 2 Level) and State Universities	Formal Estab. Date	Quality Measures	Average Q. M.	Q.M.>0.05
1- İstanbul (İstanbul)				
Boğaziçi University	1971	0,393229	0,170913	1
Galatasaray University	1994	0,23753		
Marmara University	1982	0,125735		
İstanbul University	1933	0,122796		
İstanbul Technical University	1944	0,113163		
Mimar Sinan Fine Arts University	1982	0,117254		
Yıldız Technical University	1982	0,086686		
2- Tekirdağ (Edirne-Tekirdağ-Kırklareli)				
Trakya University (Edirne)	1982	0,051063	0,053875	1
Namık Kemal University (Tekirdağ)	2006	0,056687		
Kırklareli University (Kırklareli)	2007	-		
3- Balıkesir (Balıkesir-Çanakkale)				
Balıkesir University (Balıkesir)	1992	0,047728	0,042901	0
Çanakkale Onsekiz Mart University (Çanakkale)	1992	0,038075		
4- İzmir (İzmir)				
Ege University	1955	0,086266	0,089953	1
Dokuz Eylül University	1982	0,093639		
5- Aydın (Denizli-Aydın-Muğla)				
Pamukkale University (Denizli)	1992	0,042541	0,042059	0
Adnan Menderes University (Aydın)	1992	0,038418		
Muğla University (Muğla)	1992	0,04522		
6- Manisa (Manisa-Afyonkarahisar-Kütahya-Uşak)				
Celal Bayar University (Manisa)	1992	0,047554	0,038876	0
Afyon Kocatepe University (Afyon)	1992	0,042528		
Dumlupınar University (Kütahya)	1992	0,035986		
Uşak University (Uşak)	2006	0,029437		
7- Bursa (Bursa-Eskişehir-Bilecik)				
Uludağ University (Bursa)	1975	0,062854	0,100169	1
Eskişehir Osmangazi University (Eskişehir)	1970	0,03915		
Anadolu University (Eskişehir)	1958	0,198502		
Bilecik University (Bilecik)	2007	-		
8- Kocaeli (Kocaeli-Sakarya-Düzce-Bolu-Yalova)				
Kocaeli University (Kocaeli)	1992	0,062598	0,050198	1
Sakarya University (Sakarya)	1970	0,04952		
Düzce University (Düzce)	2006	0,036881		
Abant İzzet Baysal University (Bolu)	1992	0,051794		
Yalova University (Yalova)	2008	-		
9- Ankara (Ankara)				
Ankara University	1946	0,103326	0,138363	1
Hacettepe University	1954	0,146075		
Middle Eastern Technical University	1956	0,186373		
Gazi University	1982	0,117677		
10- Konya (Konya-Karaman)				
Selçuk University (Konya)	1975	0,057525	0,057525	1
Karamanoğlu Mehmetbey University (Karaman)	2007	-		
11- Antalya (Antalya-Isparta-Burdur)				
Akdeniz University (Antalya)	1982	0,067584	0,045173	0
Süleyman Demirel University (Isparta)	1992	0,030104		
Mehmet Akif Ersoy Üniversitesi (Burdur)	2006	0,037832		
12- Adana (Adana-Mersin)				
Çukurova University (Adana)	1973	0,105303	0,082184	1
Mersin University (Mersin)	1992	0,059065		

Regions (NUTS 2 Level) and State Universities	Formal Estab. Date	Quality Measures	Average Q. M.	Q.M.>0.05
13- Hatay (Hatay-Kahramanmaraş-Osmaniye)				
Mustafa Kemal University (Hatay)	1992	0,049508		
Kahramanmaraş Sütçü İmam University (Kahramanmaraş)	1992	0,032848	0,041178	0
Osmaniye Korkut Ata University (Osmaniye)	2007	-		
14- Kırıkkale (Nevşehir-Aksaray-Niğde-Kırıkkale-Kırşehir)				
Nevşehir University (Nevşehir)	2007	-		
Aksaray University (Aksaray)	2006	0,039363		
Niğde University (Niğde)	1992	0,030987	0,040488	0
Kırıkkale University (Kırıkkale)	1992	0,043162		
Ahi Evran University (Kırşehir)	2006	0,04844		
15- Kayseri (Kayseri-Sivas-Yozgat)				
Erciyes University (Kayseri)	1978	0,056579		
Cumhuriyet University (Sivas)	1974	0,036206	0,043658	0
Bozok University (Yozgat)	2006	0,03819		
16- Zonguldak (Zonguldak-Karabük-Bartın)				
Zonguldak Karaelmas University (Zonguldak)	1992	0,035036		
Karabük University (Karabük)	2008	-	0,035036	0
Bartın University (Bartın)	2008	-		
17- Kastamonu (Kastamonu-Çankırı-Sinop)				
Kastamonu University (Kastamonu)	2006	0,042814		
Çankırı Karatekin University (Çankırı)	2007	-	0,042814	0
Sinop University (Sinop)	2007	-		
18- Samsun (Samsun-Tokat-Çorum-Amasya)				
Ondokuz Mayıs University (Samsun)	1975	0,058012		
Gaziosman Paşa University (Tokat)	1992	0,044466	0,048456	0
Hitit University (Çorum)	2006	0,046079		
Amasya University (Amasya)	2006	0,045267		
19- Trabzon (Trabzon-Ordu-Giresun-Rize-Artvin-Gümüşhane)				
Karadeniz Teknik University (Trabzon)	1955	0,058797		
Ordu University (Ordu)	2006	0,055553		
Giresun University (Giresun)	2006	0,040501	0,05658	1
Rize University (Rize)	2006	0,071469		
Artvin Çoruh University (Artvin)	2007	-		
Gümüşhane University (Gümüşhane)	2008	-		
20- Erzurum (Erzurum-Erzincan-Bayburt)				
Atatürk University (Erzurum)	1957	0,053158		
Erzincan University (Erzincan)	2006	0,057435	0,055296	1
Bayburt University (Bayburt)	2008	-		
21- Ağrı (Kars-Ağrı-Iğdır-Ardahan)				
Kafkas University (Kars)	1992	0,050087		
Ağrı İbrahim Çeçen University (Ağrı)	2007	-	0,050087	1
Iğdır University (Iğdır)	2008	-		
Ardahan University (Ardahan)	2008	-		
22- Malatya (Malatya-Elazığ-Bingöl-Tunceli)				
İnönü University (Malatya)	1975	0,061651		
Fırat University (Elazığ)	1975	0,06057	0,06111	1
Bingöl University (Bingöl)	2007	-		
Tunceli University (Tunceli)	2008	-		
23- Van (Van-Muş-Bitlis-Hakkari)				
Yüzüncü Yıl University (Van)	1982	0,057264		
Muş Alparslan University (Muş)	2007	-	0,057264	1
Bitlis Eren University (Bitlis)	2007	-		
Hakkari University (Hakkari)	2008	-		
24- Gaziantep (Gaziantep-Adıyaman-Kilis)				

Regions (NUTS 2 Level) and State Universities	Formal Estab. Date	Quality Measures	Average Q. M.	Q.M.>0.05
Gaziantep University (Gaziantep)	1987	0,061336		
Adıyaman University (Adıyaman)	2006	0,060555	0,060946	1
Kilis 7 Aralık University (Kilis)	2007	-		
25- Şanlıurfa (Diyarbakır-Şanlıurfa)				
Dicle University (Diyarbakır)	1974	0,09977	0,073206	1
Harran University (Şanlıurfa)	1992	0,046642		
26- Mardin (Siirt-Mardin-Batman-Şırnak)				
Siirt University (Siirt)	2007	-	-	0
Mardin Artuklu University (Mardin)	2007	-		
Batman University (Batman)	2007	-		
Şırnak University (Şırnak)	2008	-		

Source: TURKSTAT (2009), The Council of Higher Education (2009)

Annex 2. Labor Force Status by Non-Institutional Population (2008)

NUTS 2[a]	Non-Inst. Pop.[b]	Pop. (15+)[b]	LF[b]	Emp.[b]	Unemp.[b]	LFPR (%)	UR (%)	ER (%)	Not in LF[b]
TOTAL	69.724	50.772	23.805	21.194	2.611	46,9	11,0	41,7	26.967
TR10 *(İstanbul)*	12.491	9.499	4.416	3.923	493	46,5	11,2	41,3	5.083
TR21 *(Tekirdağ)*	1.430	1.151	613	544	69	53,2	11,2	47,3	538
TR22 *(Balıkesir)*	1.554	1.261	594	550	45	47,1	7,5	43,6	666
TR31 *(İzmir)*	3.694	2.937	1.327	1.171	156	45,2	11,8	39,9	1.610
TR32 *(Aydın)*	2.599	2.012	1.005	897	108	50,0	10,8	44,6	1.007
TR33 *(Manisa)*	2.858	2.164	952	873	79	44,0	8,3	40,3	1.211
TR41 *(Bursa)*	3.340	2.608	1.283	1.151	132	49,2	10,3	44,1	1.325
TR42 *(Kocaeli)*	3.045	2.277	1.082	965	117	47,5	10,8	42,4	1.195
TR51 *(Ankara)*	4.394	3.407	1.533	1.352	180	45,0	11,8	39,7	1.875
TR52 *(Konya)*	2.160	1.584	812	729	83	51,3	10,2	46,0	772
TR61 *(Antalya)*	2.404	1.827	1.036	943	92	56,7	8,9	51,6	792
TR62 *(Adana)*	3.560	2.534	1.200	998	202	47,4	16,8	39,4	1.334
TR63 *(Hatay)*	2.832	1.897	862	725	137	45,4	15,8	38,2	1.035
TR71 *(Kırıkkale)*	1.467	1.059	400	359	41	37,8	10,1	33,9	659
TR72 *(Kayseri)*	2.255	1.624	645	572	73	39,7	11,4	35,2	979
TR81 *(Zonguldak)*	1.002	782	421	392	29	53,8	6,9	50,1	361
TR82 *(Kastamonu)*	721	554	295	276	20	53,3	6,7	49,8	258
TR83 *(Samsun)*	2.680	1.966	1.089	1.008	81	55,4	7,4	51,3	877
TR90 *(Trabzon)*	2.467	1.859	1.137	1.071	66	61,1	5,8	57,6	723
TRA1 *(Erzurum)*	1.031	713	368	345	23	51,6	6,3	48,4	345
TRA2 *(Ağrı)*	1.102	647	334	315	19	51,6	5,6	48,8	313
TRB1 *(Malatya)*	1.569	1.136	483	413	70	42,6	14,5	36,4	652
TRB2 *(Van)*	1.926	1.093	425	364	60	38,9	14,2	33,3	668
TRC1 *(Gaziantep)*	2.264	1.447	634	530	104	43,8	16,4	36,6	813
TRC2 *(Şanlıurfa)*	2.988	1.696	540	464	76	31,8	14,1	27,3	1.157
TRC3 *(Mardin)*	1.890	1.039	319	264	56	30,7	17,4	25,4	720

Source: TURKSTAT (2009)
a) Provinces in parentheses represent the region.
b) Thousand person.

Annex 3. Participation, Unemployment, and Employment Rates by Sex (2008)

NUTS 2[a]	LFPR (%)[b]			UR (%)[b]			ER (%)[b]		
	T[c]	M[c]	F[c]	T	M	F	T	M	F
TOTAL	46,9	70,1	24,5	11,0	10,7	11,6	41,7	62,6	21,6
TR10 *(İstanbul)*	46,5	70,6	22,0	11,2	10,4	13,7	41,3	63,3	19,0
TR21 *(Tekirdağ)*	53,2	73,5	33,2	11,2	9,4	15,3	47,3	66,6	28,1
TR22 *(Balıkesir)*	47,1	67,1	27,7	7,5	6,8	9,2	43,6	62,5	25,1
TR31 *(İzmir)*	45,2	66,8	24,5	11,8	10,8	14,4	39,9	59,6	21,0
TR32 *(Aydın)*	50,0	70,5	30,2	10,8	9,8	12,9	44,6	63,5	26,3
TR33 *(Manisa)*	44,0	68,8	19,9	8,3	8,5	7,9	40,3	63,0	18,3
TR41 *(Bursa)*	49,2	73,0	25,5	10,3	9,4	13,0	44,1	66,2	22,2
TR42 *(Kocaeli)*	47,5	71,6	24,0	10,8	9,9	13,4	42,4	64,6	20,8
TR51 *(Ankara)*	45,0	68,1	22,8	11,8	10,1	16,7	39,7	61,2	19,0
TR52 *(Konya)*	51,3	75,9	27,6	10,2	9,0	13,6	46,0	69,1	23,9
TR61 *(Antalya)*	56,7	76,8	36,6	8,9	8,2	10,4	51,6	70,5	32,8
TR62 *(Adana)*	47,4	71,5	24,0	16,8	15,3	21,3	39,4	60,6	18,9
TR63 *(Hatay)*	45,4	71,1	22,3	15,8	16,0	15,4	38,2	59,7	18,8
TR71 *(Kırıkkale)*	37,8	64,7	13,9	10,1	10,7	7,7	33,9	57,8	12,9
TR72 *(Kayseri)*	39,7	66,9	13,9	11,4	11,3	11,9	35,2	59,3	12,3
TR81 *(Zonguldak)*	53,8	68,4	39,9	6,9	8,4	4,4	50,1	62,6	38,1
TR82 *(Kastamonu)*	53,3	70,0	37,5	6,7	6,5	7,0	49,8	65,5	34,9
TR83 *(Samsun)*	55,4	74,6	38,1	7,4	8,2	6,0	51,3	68,5	35,8
TR90 *(Trabzon)*	61,1	74,5	48,2	5,8	6,2	5,2	57,6	69,9	45,7
TRA1 *(Erzurum)*	51,6	71,8	32,2	6,3	7,8	2,9	48,4	66,2	31,2
TRA2 *(Ağrı)*	51,6	73,5	32,9	5,6	8,0	0,9	48,8	67,5	32,6
TRB1 *(Malatya)*	42,6	68,4	18,9	14,5	14,1	16,1	36,4	58,8	15,8
TRB2 *(Van)*	38,9	67,6	12,2	14,2	15,4	8,1	33,3	57,2	11,2
TRC1 *(Gaziantep)*	43,8	72,7	15,8	16,4	18,6	6,6	36,6	59,2	14,7
TRC2 *(Şanlıurfa)*	31,8	58,0	8,1	14,1	15,5	4,8	27,3	49,0	7,7
TRC3 *(Mardin)*	30,7	60,4	3,9	17,4	17,8	12,3	25,4	49,6	3,4

Source: TURKSTAT (2009)
a) Provinces in parentheses represent the region.
b) 15+ age.
c) T: Total, M: Male, F: Female.

Annex 4. Labor Force Participation Rates by Year (2004-2008)

NUTS2[a]	LFPR (%)[b]				
	2004	2005	2006	2007	2008
TOTAL	46,3	46,4	46,3	46,2	46,9
TR10 *(İstanbul)*	45,2	46,3	46,6	45,7	46,5
TR21 *(Tekirdağ)*	54,4	55,7	54,4	52,0	53,2
TR22 *(Balıkesir)*	47,3	49,0	48,6	51,0	47,1
TR31 *(İzmir)*	45,7	44,6	44,7	46,4	45,2
TR32 *(Aydın)*	55,3	51,9	49,8	49,2	50,0
TR33 *(Manisa)*	47,8	45,1	46,7	44,8	44,0
TR41 *(Bursa)*	51,2	51,3	49,2	49,2	49,2
TR42 *(Kocaeli)*	41,2	43,9	45,6	45,6	47,5
TR51 *(Ankara)*	43,8	44,6	44,9	45,1	45,0
TR52 *(Konya)*	42,0	40,4	41,1	44,7	51,3
TR61 *(Antalya)*	51,5	51,3	55,8	55,9	56,7
TR62 *(Adana)*	42,8	45,1	46,4	47,9	47,4
TR63 *(Hatay)*	41,0	46,2	43,8	43,3	45,4
TR71 *(Kırıkkale)*	44,3	45,3	45,9	43,0	37,8

NUTS2[a]	LFPR (%)[b]				
	2004	2005	2006	2007	2008
TR72 *(Kayseri)*	37,8	42,1	38,7	40,6	39,7
TR81 *(Zonguldak)*	46,5	50,9	50,5	49,9	53,8
TR82 *(Kastamonu)*	38,2	37,0	53,4	48,7	53,3
TR83 *(Samsun)*	55,1	53,1	51,6	54,9	55,4
TR90 *(Trabzon)*	65,8	63,7	61,0	59,2	61,1
TRA1 *(Erzurum)*	58,0	53,5	48,3	44,4	51,6
TRA2 *(Ağrı)*	44,2	48,1	51,1	50,3	51,6
TRB1 *(Malatya)*	44,4	42,2	42,0	42,1	42,6
TRB2 *(Van)*	40,4	40,3	41,6	41,1	38,9
TRC1 *(Gaziantep)*	41,5	40,8	39,4	40,9	43,8
TRC2 *(Şanlıurfa)*	37,0	34,4	31,5	30,8	31,8
TRC3 *(Mardin)*	38,9	32,7	29,8	30,1	30,7

Source: TURKSTAT (2009)
a) Provinces in parentheses represent the region.
b) 15+ age.

Annex 5. Reasons of Not Being in Labor Force (2008)

		Reason[c]							
		Not Seeking a Job, But Available to Start							
NUTS2[a]	Pop. Not in LF[b]	Dis.[d]	Other	WS[d]	HW[d]	Education/ Training	R[d]	D[d]	Other
TOTAL	26.966	2,3	4,6	1,2	45,2	13,9	12,9	12,7	7,3
TR10 *(İstanbul)*	5.083	0,2	2,1	0,0	37,1	16,3	16,3	8,9	19,1
TR21 *(Tekirdağ)*	538	4,5	7,2	0,4	25,5	16,9	10,6	21,0	14,1
TR22 *(Balıkesir)*	666	5,3	7,1	0,6	39,9	10,7	15,8	17,6	3,3
TR31 *(İzmir)*	1.610	0,2	1,2	0,3	50,6	15,1	24,5	5,7	2,4
TR32 *(Aydın)*	1.006	1,2	7,7	2,0	40,1	10,9	17,0	17,7	3,6
TR33 *(Manisa)*	1.211	0,4	2,0	3,4	54,1	11,9	14,0	12,6	1,7
TR41 *(Bursa)*	1.325	0,1	1,2	1,6	47,6	11,5	19,3	13,0	5,7
TR42 *(Kocaeli)*	1.195	0,3	2,1	1,2	54,6	13,7	16,0	7,9	4,1
TR51 *(Ankara)*	1.875	0,3	2,9	0,2	51,5	17,0	19,8	5,7	2,6
TR52 *(Konya)*	772	2,6	16,2	1,2	35,2	11,8	6,2	18,7	8,2
TR61 *(Antalya)*	791	1,9	9,4	1,4	26,0	12,1	8,1	26,2	14,8
TR62 *(Adana)*	1.334	3,5	10,0	0,2	40,3	14,2	9,8	13,9	8,0
TR63 *(Hatay)*	1.035	5,9	9,0	0,9	43,7	13,0	5,3	18,1	4,1
TR71 *(Kırıkkale)*	659	3,2	3,2	1,5	55,7	10,9	12,0	11,7	1,7
TR72 *(Kayseri)*	979	1,8	4,3	0,7	57,6	11,5	12,6	8,6	2,9
TR81 *(Zonguldak)*	361	0,6	1,1	0,3	50,4	12,5	18,6	14,4	2,8
TR82 *(Kastamonu)*	258	3,9	9,7	-	25,6	10,1	9,3	28,7	12,8
TR83 *(Samsun)*	877	1,1	4,7	2,1	40,8	14,8	9,5	22,5	4,6
TR90 *(Trabzon)*	723	2,9	5,7	2,6	31,1	20,5	7,1	26,1	4,0
TRA1 *(Erzurum)*	345	1,7	10,7	0,3	47,0	15,7	9,0	12,5	3,2
TRA2 *(Ağrı)*	313	7,3	5,1	0,3	51,1	11,2	1,6	19,5	3,5
TRB1 *(Malatya)*	652	3,5	4,9	1,7	52,1	16,1	9,4	11,5	0,9
TRB2 *(Van)*	668	7,6	8,7	0,4	50,1	13,2	2,7	11,4	5,7
TRC1 *(Gaziantep)*	813	0,5	2,5	7,1	57,1	10,6	6,5	12,3	3,4
TRC2 *(Şanlıurfa)*	1.157	11,6	3,1	3,4	56,9	11,7	2,5	9,8	1,1
TRC3 *(Mardin)*	720	6,4	4,3	0,6	59,0	12,1	2,5	10,4	4,7

Source: TURKSTAT (2009)
a) Provinces in parentheses represent the region.
b) Thousand person, 15+ age.
c) 15+ age.
d) Dis.: Discouraged, WS: Working Seasonally, HW: Housewife, R: Retired, and D: Disabled, Old, Ill, etc.

Annex 6. Decomposition of Employed by Economic Activity (2008)

NUTS2[a]	Agriculture[b] (%)	Industry[b] (%) (*)	Services[b] (%)
TOTAL	23,7	26,8	49,5
TR10 *(İstanbul)*	0,4	40,1	59,5
TR21 *(Tekirdağ)*	20,2	34,6	45,2
TR22 *(Balıkesir)*	38,2	21,1	40,7
TR31 *(İzmir)*	7,5	31,5	61,0
TR32 *(Aydın)*	27,3	20,5	52,1
TR33 *(Manisa)*	35,4	26,5	38,1
TR41 *(Bursa)*	13,2	42,6	44,2
TR42 *(Kocaeli)*	17,1	35,2	47,8
TR51 *(Ankara)*	2,0	25,6	72,4
TR52 *(Konya)*	33,3	22,6	44,2
TR61 *(Antalya)*	33,7	15,1	51,3
TR62 *(Adana)*	24,8	22,9	52,1
TR63 *(Hatay)*	29,0	27,2	44,0
TR71 *(Kırıkkale)*	27,3	19,2	53,8
TR72 *(Kayseri)*	28,5	24,8	46,5
TR81 *(Zonguldak)*	46,4	20,9	32,7
TR82 *(Kastamonu)*	49,6	15,6	35,1
TR83 *(Samsun)*	49,7	15,4	34,9
TR90 *(Trabzon)*	51,1	13,4	35,5
TRA1 *(Erzurum)*	50,7	9,3	40,3
TRA2 *(Ağrı)*	70,2	5,1	25,1
TRB1 *(Malatya)*	33,2	18,2	48,7
TRB2 *(Van)*	34,3	13,7	52,2
TRC1 *(Gaziantep)*	32,1	33,0	34,9
TRC2 *(Şanlıurfa)*	33,4	16,8	49,8
TRC3 *(Mardin)*	25,8	19,3	54,5

Source: TURKSTAT (2009)

a) Provinces in parentheses represent the region.

b) 15+ age.

(*) Including construction sector.

Annex 7. Decomposition of Employed by Employment Status (2008)

NUTS2[a]	TOTAL[b]				AGRICULTURE[b]				NON-AGRICULTURE[b]			
	Total[c]	R & CE[d]	E & OAW[d]	UFW[d]	Total[c]	R & CE[d]	E & OAW[d]	UFW[d]	Total[c]	R & CE[d]	E & OAW[d]	UFW[d]
TOTAL	21.194	61,0	26,3	12,7	5.016	8,7	46,2	45,2	16.177	77,3	20,1	2,6
TR10 *(İstanbul)*	3.923	81,1	18,2	0,7	14	42,9	57,1	-	3.909	81,2	18,1	0,7
TR21 *(Tekirdağ)*	544	61,0	25,6	13,4	110	4,5	48,2	47,3	434	75,3	19,8	4,8
TR22 *(Balıkesir)*	550	49,8	31,1	19,1	210	10,0	46,7	43,3	339	74,6	21,5	3,8
TR31 *(İzmir)*	1.171	75,6	20,1	4,4	88	23,9	44,3	30,7	1.083	79,8	18,0	2,2
TR32 *(Aydın)*	897	54,1	30,5	15,4	245	11,8	45,7	42,4	651	70,0	24,7	5,2
TR33 *(Manisa)*	873	52,1	30,0	17,9	309	8,1	46,6	45,3	564	76,2	20,7	3,0
TR41 *(Bursa)*	1.151	74,1	18,9	7,0	152	15,1	47,4	38,2	999	83,1	14,5	2,3
TR42 *(Kocaeli)*	965	67,5	23,1	9,4	165	6,7	49,7	43,0	800	80,0	17,6	2,4
TR51 *(Ankara)*	1.352	82,9	15,7	1,5	27	14,8	63,0	18,5	1.325	84,2	14,7	1,1
TR52 *(Konya)*	729	48,1	35,3	16,6	243	9,1	49,4	42,0	487	67,8	28,1	4,1
TR61 *(Antalya)*	943	51,5	28,8	19,6	318	6,9	42,8	50,3	626	74,1	21,7	4,0
TR62 *(Adana)*	998	62,7	27,4	9,9	248	27,0	41,5	31,5	750	74,5	22,7	2,8
TR63 *(Hatay)*	725	59,0	29,7	11,3	210	19,0	48,6	31,9	516	75,2	21,7	2,9

TR71 *(Kırıkkale)*	359	57,9	32,3	9,7	98	9,2	61,2	29,6	261	76,6	21,5	1,9
TR72 *(Kayseri)*	572	54,0	31,3	14,7	163	4,3	52,1	43,6	408	73,8	23,3	2,9
TR81 *(Zonguldak)*	392	40,6	33,2	26,3	182	1,6	48,9	49,5	210	74,3	19,5	5,7
TR82 *(Kastamonu)*	276	39,1	31,5	29,3	137	3,6	40,9	54,7	139	73,4	21,6	4,3
TR83 *(Samsun)*	1.008	38,7	29,6	31,7	501	2,6	38,7	58,7	507	74,4	20,7	4,9
TR90 *(Trabzon)*	1.071	34,8	39,5	25,6	547	2,0	52,1	45,9	524	69,3	26,5	4,4
TRA1 *(Erzurum)*	345	39,4	29,0	31,6	175	1,1	38,9	60,0	170	78,8	18,8	2,4
TRA2 *(Ağrı)*	315	20,0	39,0	41,0	221	1,8	41,6	56,6	94	62,8	33,0	4,3
TRB1 *(Malatya)*	413	49,9	32,7	17,4	137	5,1	49,6	45,3	276	71,7	24,3	3,6
TRB2 *(Van)*	364	43,4	36,3	20,6	125	4,8	47,2	48,0	240	63,3	30,4	6,3
TRC1 *(Gaziantep)*	530	55,1	28,1	17,0	170	7,6	44,1	48,2	360	77,5	20,3	2,2
TRC2 *(Şanlıurfa)*	464	53,2	33,8	12,9	155	26,5	42,6	31,0	309	67,0	29,4	3,6
TRC3 *(Mardin)*	264	61,0	30,7	8,3	68	23,5	52,9	23,5	196	73,5	23,0	3,1

Source: TURKSTAT (2009)
a) Provinces in parentheses represent the region.
b) 15+ age.
c) Thousand person.
d) (%), R & CE: Regular and Casual Employee, E & OAW: Employer and Own Account Worker, UFW: Unpaid Family Worker

Annex 8. Labor Force Participation Rates by Education Level (2004 vs. 2008)

NUTS2[a]	I[b]		UHS[b]		HS[b]		Hig. E[b]	
	2004[c]	2008[c]	2004[c]	2008[c]	2004[c]	2008[c]	2004[c]	2008[c]
TR10 *(İstanbul)*	8,4	6,7	43,3	41,4	53,9	53,0	78,7	76,3
TR21 *(Tekirdağ)*	25,8	16,3	54,8	49,6	66,7	59,0	78,1	80,8
TR22 *(Balıkesir)*	29,3	15,7	50,0	45,6	47,3	56,9	75,4	75,5
TR31 *(İzmir)*	16,2	11,0	47,4	39,6	59,3	51,1	77,3	70,9
TR32 *(Aydın)*	30,6	15,0	59,4	48,6	59,0	60,7	77,1	76,8
TR33 *(Manisa)*	18,8	12,1	50,7	43,1	58,7	56,4	81,3	79,2
TR41 *(Bursa)*	21,5	8,7	52,0	43,6	64,1	65,8	80,2	79,6
TR42 *(Kocaeli)*	16,2	13,5	40,2	43,2	53,7	58,6	79,5	79,6
TR51 *(Ankara)*	9,8	6,0	38,7	34,6	53,9	52,7	79,4	73,7
TR52 *(Konya)*	18,4	17,6	45,5	49,7	55,6	60,9	83,7	85,9
TR61 *(Antalya)*	27,2	21,4	54,2	56,2	57,0	63,6	78,5	81,0
TR62 *(Adana)*	18,3	17,8	45,7	46,9	50,8	54,2	80,0	78,5
TR63 *(Hatay)*	16,5	20,6	43,2	46,8	50,5	54,0	82,6	81,1
TR71 *(Kırıkkale)*	21,3	10,3	47,5	36,8	52,6	50,3	83,9	82,1
TR72 *(Kayseri)*	17,7	11,4	39,1	38,0	55,7	52,7	79,9	80,0
TR81 *(Zonguldak)*	28,6	35,8	46,8	53,2	61,0	63,1	78,6	79,3
TR82 *(Kastamonu)*	16,0	33,7	39,7	51,7	59,0	67,3	77,7	80,5
TR83 *(Samsun)*	44,0	36,9	60,5	56,0	62,6	58,6	82,8	81,7
TR90 *(Trabzon)*	55,1	40,8	69,5	62,2	70,1	64,6	87,0	85,2
TRA1 *(Erzurum)*	47,6	35,8	58,3	49,1	57,5	58,5	85,2	81,6
TRA2 *(Ağrı)*	31,9	37,7	49,2	55,7	53,6	58,6	70,4	88,6
TRB1 *(Malatya)*	31,9	18,1	45,0	42,4	61,1	54,0	80,3	80,5
TRB2 *(Van)*	22,9	19,3	45,7	40,9	60,3	58,3	91,6	83,8
TRC1 *(Gaziantep)*	13,8	18,9	45,6	48,8	52,2	55,5	87,4	80,1
TRC2 *(Şanlıurfa)*	23,6	12,6	46,0	38,1	53,0	47,4	83,0	78,9
TRC3 *(Mardin)*	26,2	9,9	44,8	37,6	51,8	49,2	86,1	90,4

Source: TURKSTAT (2009)
a) Provinces in parentheses represent the region.
b) I: Illiterate, UHS: Under High School, HS: High School, Hig. E: Higher Education.
c) 15+ age.

Annex 9. Labor Force Participation Rates by Education Level and Sex (2008)

NUTS2[a]	I[b]		UHS[b]		HS[b]		Hig. E[b]	
	M[c]	F[c]	M[c]	F[c]	M[c]	F[c]	M[c]	F[c]
TR10 *(İstanbul)*	31,0	3,4	69,1	12,7	70,1	32,3	81,4	69,8
TR21 *(Tekirdağ)*	43,0	7,6	71,8	28,4	74,6	39,5	86,3	73,8
TR22 *(Balıkesir)*	19,2	14,7	65,8	26,5	73,5	32,7	82,4	63,7
TR31 *(İzmir)*	35,9	7,5	64,8	15,5	66,8	32,4	76,2	64,6
TR32 *(Aydın)*	24,1	13,4	69,9	26,3	73,7	44,1	81,2	71,1
TR33 *(Manisa)*	28,7	8,8	67,6	19,1	73,6	25,7	84,9	67,6
TR41 *(Bursa)*	12,0	8,2	69,3	19,4	81,8	41,1	83,6	73,4
TR42 *(Kocaeli)*	32,8	10,8	69,7	18,5	74,8	33,7	82,1	75,9
TR51 *(Ankara)*	25,7	3,0	64,3	9,5	69,1	31,2	78,2	68,0
TR52 *(Konya)*	40,1	13,7	75,6	25,6	74,5	36,7	90,1	77,9
TR61 *(Antalya)*	29,0	19,9	76,0	35,9	80,9	39,7	87,0	71,8
TR62 *(Adana)*	42,6	10,7	71,9	20,9	71,3	33,3	84,8	68,3
TR63 *(Hatay)*	32,8	17,7	72,6	20,6	73,4	26,8	85,6	72,1
TR71 *(Kırıkkale)*	23,9	8,2	62,7	11,5	69,8	18,0	88,2	70,6
TR72 *(Kayseri)*	19,4	9,9	64,6	11,4	75,0	18,0	86,4	66,1
TR81 *(Zonguldak)*	31,3	36,7	66,5	39,7	77,4	36,9	85,4	69,1
TR82 *(Kastamonu)*	30,3	34,5	67,6	36,5	83,6	37,5	84,5	71,7
TR83 *(Samsun)*	42,0	35,7	75,4	37,0	76,2	32,9	85,6	74,9
TR90 *(Trabzon)*	37,1	41,4	74,2	49,5	76,8	45,3	88,0	79,5
TRA1 *(Erzurum)*	50,7	33,4	68,8	31,2	74,8	23,3	87,4	66,9
TRA2 *(Ağrı)*	46,3	36,3	76,0	36,3	71,4	20,1	94,2	76,8
TRB1 *(Malatya)*	30,2	16,0	69,3	15,4	69,8	25,7	85,7	71,1
TRB2 *(Van)*	52,4	12,7	67,4	7,7	70,7	22,7	84,8	81,1
TRC1 *(Gaziantep)*	45,2	13,0	75,5	15,0	70,4	22,5	89,3	63,3
TRC2 *(Şanlıurfa)*	37,8	7,1	59,5	6,8	60,7	11,4	82,3	69,9
TRC3 *(Mardin)*	46,0	1,9	61,2	3,9	60,8	12,9	96,1	69,9

Source: TURKSTAT (2009)
a) Provinces in parentheses represent the region.
b) I: Illiterate, UHS: Under High School, HS: High School, Hig. E: Higher Education.
c) M: Male, F: Female, and 15+ age.

Annex 10. Labor Force Participation by Age and Sex (2008)

NUTS2[a]	15-19		20-24		25-34		35-54		55+	
	M[b]	F[b]	M[b]	F[b]	M[b]	F[b]	M[b]	F[b]	M[b]	F[b]
TR10 *(İstanbul)*	32,0	18,4	70,9	38,5	95,7	33,4	84,3	18,9	20,7	1,7
TR21 *(Tekirdağ)*	39,1	20,6	68,1	50,2	95,3	50,7	86,9	37,5	42,7	8,8
TR22 *(Balıkesir)*	36,4	20,7	73,1	45,7	95,4	38,3	84,1	34,1	31,1	10,4
TR31 *(İzmir)*	38,3	15,5	68,5	38,2	95,0	38,5	80,8	27,6	22,9	3,6
TR32 *(Aydın)*	42,2	26,4	74,9	47,5	96,1	43,9	86,0	34,4	31,3	9,3
TR33 *(Manisa)*	39,3	13,2	74,3	24,8	93,4	27,2	82,6	23,4	29,9	8,8
TR41 *(Bursa)*	42,4	23,2	83,9	41,2	96,5	35,8	85,9	27,1	28,4	6,0
TR42 *(Kocaeli)*	35,2	17,2	77,0	38,1	95,8	33,1	85,9	24,4	30,2	7,8
TR51 *(Ankara)*	31,0	10,3	66,9	31,5	95,0	38,5	83,2	24,8	19,4	1,9
TR52 *(Konya)*	48,6	17,9	79,8	35,4	95,4	34,8	88,7	32,2	45,2	13,5
TR61 *(Antalya)*	47,2	23,8	80,5	45,2	97,1	43,7	89,4	44,6	42,1	17,5
TR62 *(Adana)*	36,1	18,1	73,5	37,3	94,5	31,2	86,5	24,8	33,3	7,5
TR63 *(Hatay)*	38,3	21,4	70,2	27,2	91,5	25,0	87,3	25,2	36,8	10,6
TR71 *(Kırıkkale)*	30,0	8,1	73,8	12,4	90,7	21,7	83,9	17,6	26,3	6,0
TR72 *(Kayseri)*	39,5	9,9	69,7	18,0	91,9	19,9	84,5	16,2	24,1	5,1
TR81 *(Zonguldak)*	28,5	29,8	76,6	50,2	96,1	43,6	81,9	44,2	39,6	31,5
TR82 *(Kastamonu)*	50,1	30,7	79,7	45,4	89,9	43,8	85,8	41,4	43,3	29,2

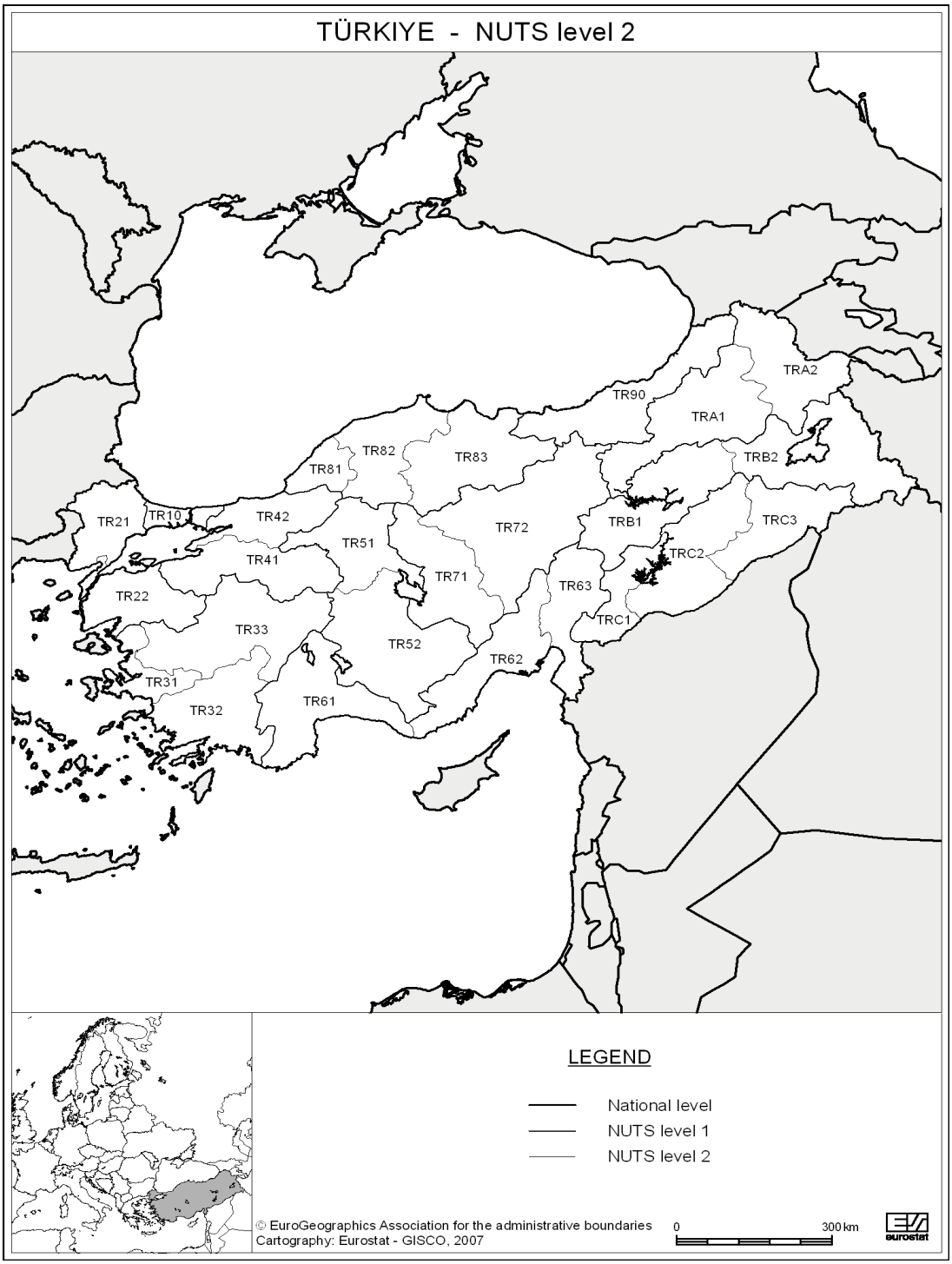
TR83 *(Samsun)*	41,8	30,3	82,0	44,4	92,8	43,4	88,3	43,4	49,5	27,0
TR90 *(Trabzon)*	28,2	27,7	66,1	51,9	92,9	52,8	90,4	60,0	59,0	35,2
TRA1 *(Erzurum)*	31,5	23,2	67,9	32,7	92,6	37,3	88,2	36,2	45,2	25,6
TRA2 *(Ağrı)*	43,5	11,5	69,0	25,6	89,0	38,3	89,0	49,3	57,1	29,2
TRB1 *(Malatya)*	33,9	9,4	66,5	22,8	91,9	21,7	85,6	22,0	34,0	13,8
TRB2 *(Van)*	35,1	8,2	65,5	11,5	85,5	15,7	87,4	14,9	39,6	6,7
TRC1 *(Gaziantep)*	50,7	16,3	80,3	20,5	92,8	16,4	86,0	16,7	37,8	9,2
TRC2 *(Şanlıurfa)*	31,0	9,0	54,2	12,5	76,3	8,4	74,4	7,3	30,4	2,5
TRC3 *(Mardin)*	30,1	5,8	56,2	5,9	81,9	4,8	80,2	1,9	29,9	0,5

Source: TURKSTAT (2009)

a) Provinces in parentheses represent the region.

b) M: Male, F: Female, and 15+ age.

Annex 11. Statistical Regions of Turkey (NUTS Level 2)



Source: EUROSTAT (2007)

Annex 12. Definitions of Variables

Variables	Categories	Values
Dependent Variable: LFP	Participation/Non-Participation	1/0
Independent Variables: *Individual Characteristics*		
Sex Dummy	Male/Female	1/0
Age Dummies	Age 15-19	1/0
	Age 20-24	1/0
	Age 25-29	1/0
	Age 30-34	1/0
	Age 35-39	1/0
	Age 40-44	1/0
	Age 45-49	1/0
Education Level Dummies	Illiterate	1/0
	Literate but No Diploma	1/0
	Primary School	1/0
	Secondary School	1/0
	High School	1/0
	Vocational School	1/0
	University and Above	1/0
Indepedent Variables: *Household Characteristics*		
Household Head Dummy	Yes/No	1/0
Marital Status Dummy	Married/Not Married	1/0
Household Size*	(Continuous Var.)	1-27
Presence of Children (0-14) Dummy	Exist/Not Exist	1/0
Indepedent Variables: *Regional Characteristics*		
Region Dummies	**TR10** *(İstanbul)*	1/0
	TR21 *(Tekirdağ)*	1/0
	TR22 *(Balıkesir)*	1/0
	TR31 *(İzmir)*	1/0
	TR32 *(Aydın)*	1/0
	TR33 *(Manisa)*	1/0
	TR41 *(Bursa)*	1/0
	TR42 *(Kocaeli)*	1/0
	TR51 *(Ankara)*	1/0
	TR52 *(Konya)*	1/0
	TR61 *(Antalya)*	1/0
	TR62 *(Adana)*	1/0
	TR63 *(Hatay)*	1/0
	TR71 *(Kırıkkale)*	1/0
	TR72 *(Kayseri)*	1/0
	TR81 *(Zonguldak)*	1/0
	TR82 *(Kastamonu)*	1/0
	TR83 *(Samsun)*	1/0
	TR90 *(Trabzon)*	1/0
	TRA1 *(Erzurum)*	1/0
	TRA2 *(Ağrı)*	1/0
	TRB1 *(Malatya)*	1/0
	TRB2 *(Van)*	1/0
	TRC1 *(Gaziantep)*	1/0
	TRC2 *(Şanlıurfa)*	1/0
	TRC3 *(Mardin)*	1/0
University-Establishment Date Dummy	After 2006/Before 2006	1/0
University-Demand Rate Dummy	High/Low	1/0