

Convergence in Divergence: Do Divorce Rates Converge Across Türkiye's Provinces?

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Abstract – Social and economic factors affecting divorce in Türkiye have been investigated in many empirical studies, and the subject has been analyzed using macro and micro scale data. In the related literature, it is stated that there is a general upward trend in divorce cases in Türkiye, although there are differences by province. At this point, it becomes important whether there is convergence or convergence in divorce rates by province. Convergence indicates that units tend to meet at a certain common level and exhibit a homogeneous structure by displaying similar behavior patterns over time. Considering the claims that regional/local differences have gradually lost their importance and weight, and a common social-cultural structure has become widespread in Türkiye as in the rest of the world in recent years, it can be expected that the similarity in divorce trends will increase.

The answer to this question is being investigated in the current study. The findings obtained by the club convergence method reveal that there is no overall convergence, although there is a clustering in terms of divorce rates at the provincial level in Türkiye. This result points to the determining effect of local characteristics on divorce decisions in Türkiye. From this point of view, it can be said that it is important to take local characteristics into account in the policies to be created to reduce divorce rates, and not to ignore the effect of the general upward trend.

Keywords – Divorce, Convergence Analysis, Turkey.

I. INTRODUCTION

In the last few decades, there has been a rapid increase in the number and rates of divorce in Türkiye, as in many developed and developing countries. The negative effects of divorce on spouses and children in the short term and on the social and economic structure in the long term require a careful examination of the divorce phenomenon by many disciplines in order to take necessary precautions. Social and economic factors affecting divorce in Türkiye have been investigated in many empirical studies, and the subject has been analyzed using macro and micro scale data. In the related literature, it is stated that there is a general upward trend in divorce cases in Türkiye, although there are differences by province. At this point, it becomes important whether there is convergence or convergence in divorce rates by province.

Convergence indicates that units tend to meet at a certain common level and exhibit a homogeneous structure by displaying similar behavior patterns over time. Considering the claims that regional/local differences have gradually lost their importance and weight and a common social-cultural structure has become widespread in Türkiye as in the rest of the world in recent years, it can be expected that the similarity in divorce trends will increase. It is possible to talk about a "spatial contagion" effect on divorce, especially today, where communication and interaction through the internet and social media have developed.

The answer to this question is being investigated in the current study. The findings obtained by the beta convergence method reveal that there is no convergence, although there is a clustering in terms of divorce rates at the provincial level in Türkiye.

The empirical literature on divorce focuses almost entirely on the investigation of socio-economic variables that affect divorce. Empirical studies on whether there is a convergence in divorce rates between different countries or regions of a country are quite scarce. In a such rare study, [1] studied the evolution of US divorce rates across states, from 1956 to 2014, using a cluster algorithm a method allows to determine the existence of divorce convergence among the US states. Their findings indicate that there are four patterns of divorce behavior in the US. We explore whether the divorce convergence is due to the liberalization of the divorce laws. Supplementary analysis of the factors related to the club classification reveals that, in the pre-reform period, geographical variables are important, but in the postreform period marital patterns appear to be associated with the club classification.

As mentioned in section 3 below, one way of investigating the existence of convergence is to investigate the stationarity of the series with unit-root tests. Although they did not directly target this, in their analysis [2] found that the divorce rates in 16 European countries are not stable, and that especially the changes made in the laws cause permanent shifts in the divorce rates. This situation can be interpreted as the 16 countries in question do not converge in terms of divorce rates.

II. DIVORCE TRENDS IN THE WORLD AND TÜRKİYE

Divorce rates have increased precipitously in several Western and Eastern societies in the last several decades. As seen from the Figure 1 divorce is a worldwide phenomenon. Ideological and structural changes associated with modernization and economic development generally are cited as explanations for increasing marital disruption. Especially, increased emphasis on self-fulfillment, intimacy within marital unions, and gender equality have challenged beliefs underlying family stability. At the same time, economic growth and increased economic independence of women have facilitated individual choice [3].

However, important drivers of population structure such as marriage and divorce rates are becoming more similar across countries as are life expectancy and fertility rates. Increased educational attainment has contributed to greater female employment participation and convergence therein across countries [4].

Though divorce rates have increased tremendously in the last 50 years around the world it is observed that the process has begun to reverse in some countries like the USA, Taiwan and Indonesia. [5], in his research based on micro-level data, states that the divorce rate in the USA is decreasing and this trend will continue in the coming years, while non-marital cohabitation relationships exhibit a rather unstable structure. The author predicts that marriage in the USA will become more and more stable and become a rarer and elite way of life.

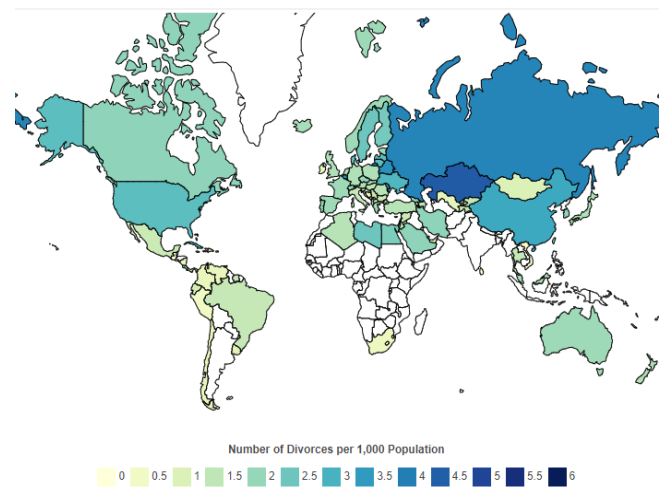


Figure 1. Divorce rates in the world.

Reforms in divorce laws made in Western countries in the 1960s and 70s led to a serious increase in divorce rates. Similarly, in the years following the change made in the civil code in 2001, divorce rates have increased significantly in Turkey. Divorce rate, which was varied within the band of 0.3-0.5 % between 1950-2000, jumped to 1.35 % in 2001 and increased even more in the following years.

It is seen that divorce cases are more common in western provinces, especially in Aegean and Mediterranean coast provinces, compared to eastern provinces in Turkey (see Figure 2). While the divorce rate in the regions with high socio-economic development level of Turkey is even above the European Union average, the divorce rate in the regions with low socio-economic development level is considerably below the Turkey average [6]. Among the many reasons for this situation are pressure from tradition and milieu, religious concerns, prevalence of consanguineous marriage, low level of education, lower urbanization, low rate of civil marriage, etc. can be mentioned.

As a result of the finalized divorce cases, 180.954 couples were divorced in 2022 and 180.592 children were given custody. 75.7% of the custody of the

children was given to the mother and 24.3% to the father in 2022 [7].

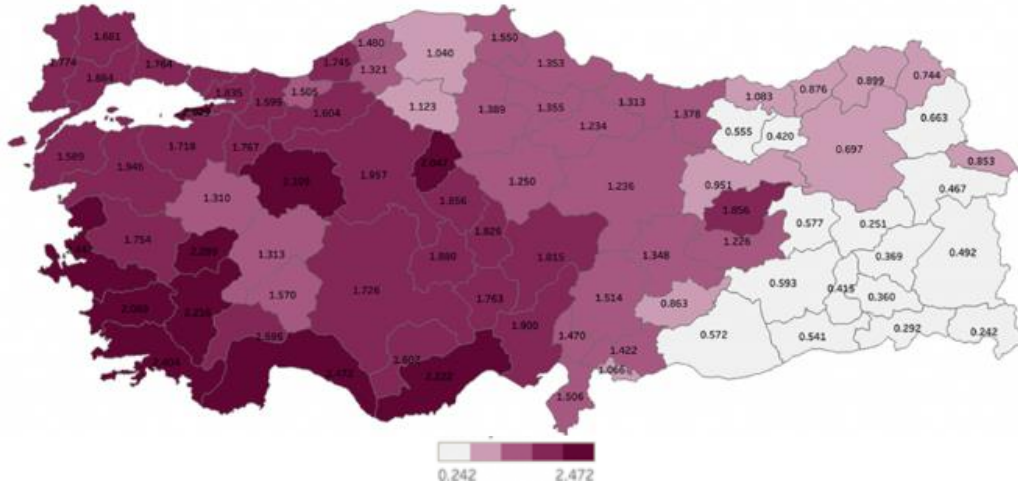


Figure 2. Crude divorce rate by province (2020)

III. MATERIALS AND METHOD

In this section, the concept of convergence and ways of measuring are discussed briefly. Then, the sample used is introduced and empirical findings are presented.

A. Concept and Measurement of Convergence

In the neoclassical Solow-Swan growth model, all economies are assumed to have the same production function and converge to a steady-state equilibrium. At the equilibrium, level of income per capita grows at an exogenous rate of technological change, while capital and output per unit of effective labor are constant. In this model, as there are diminishing returns to capital, economies with lower capital per unit of effective labor have higher rates of return and thus higher output growth rates. Therefore, for any given economy, it is expected that the lower the initial level of GDP per capita, the higher the growth rate. Thus, neoclassical growth model asserts that relatively poor economies converge to the rich ones over time [8]. On the empirical ground, the concept of convergence has its roots in the empirical debate of “economic convergence” that started by [9] and [10]. Since then, dozens of researchers have taken up their lead on this and related topics, generating a vast literature of cross-country and cross-regional studies economic growth and its determinants.

There are two main divisions in the real convergence research, i.e. beta (β) and sigma (σ)

convergence. Another possible category to add to this level is club convergence. Further, the concept of β -convergence divides into conditional and absolute aka unconditional β -convergence. Lastly, time-series econometric methods give another look at convergence in income levels. This approach historically developed from research devoted to β -convergence but also considers some aspects of σ -convergence [11]. β -convergence indicates that there is a negative relationship between the growth rates of income per capita at the beginning of the economy and income per capita in the following periods. σ -convergence suggests that the standard deviation of income per capita decreases continuously over time. While β -convergence is a necessary but not sufficient condition for σ -convergence to exist, the reverse is not the case, that is, σ -convergence need not occur for β -convergence to occur [12].

B. Method: Club Convergence

To investigate the possible existence of a common divorce rate patterns across provinces of Türkiye, we apply a cluster algorithm developed by [13] (henceforth PS) that allows to identify different groups (clubs) of provinces that converge in the evolution over time of their divorce rates. Their method uses a nonlinear time-varying factor model and provides the framework for modelling transitional dynamics as well as long-run behavior [14]. Taking into account the previous framework,

[13] and [15] develop a cluster procedure based on a log t -test, which focuses on the evolution over time of idiosyncratic transitions in relation to the common component. This new approach is different from that of prior empirical studies of growth convergence clubs to obtain different clusters of countries or regions. The method of PS concentrates on the evolution over time of divorce rates relative to the average, rather than on individual divorce rates by state. Thus, their methodology enables us to

identify the relative transitions that occur within subgroups, and to measure these transitions against the correlative of a common trend [1].

As PS put it, any panel data variable is usually composed by two components: the common components of cross-sectional dependence (g_{it}) and transitory components (a_{it}). That is:

$$DR_{it} = g_{it} + a_{it}$$

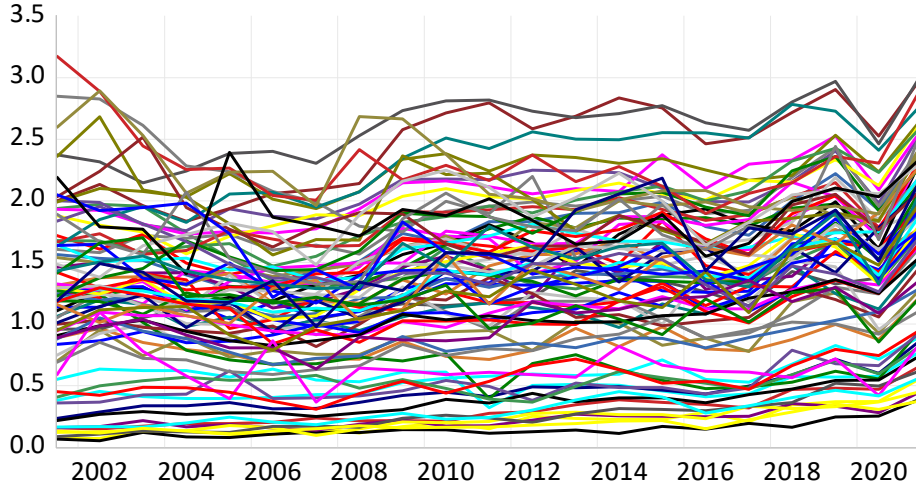


Figure 3. Time path of divorce rates in 81 provinces of Türkiye (2001-2021)

PS reformulate this expression to separate common from idiosyncratic components in the panel and obtain $DR_{it} = \left(\frac{g_{it}+a_{it}}{\mu_t}\right)\mu_t = \delta_{it}\mu_t$ for all i and t , where μ_t is a common component (that is, a common trend in divorce rates) and δ_{it} is a time-variant idiosyncratic element. Accordingly, δ_{it} measures the relative share in μ_t of province i at time t . It is assumed to have some deterministic or stochastically trending behavior that dominates the transitory component a_{it} as $t \rightarrow \infty$. This formulation enables testing for convergence by checking whether the factor δ_{it} converges [1].

They represent the model accounting for special behavior in the idiosyncratic element δ_{it} that they model in semi parametric form:

$$\delta_{it} = \delta_i + \sigma_i \theta_{it} L(t)^{-1} t^{-\alpha}$$

where δ_i is fixed, $\theta_{it} \sim iid(0,1)$ across i but weakly dependent on t , and $L(t)$ is a slowly varying function (like $\log t$) for which $L(t) \rightarrow \infty$ as $t \rightarrow \infty$. This equation ensures that δ_{it} converges to δ_i for all $\alpha \geq 0$ (the null hypothesis of interest). The parameter of

interest is δ_{it} and they focus on its temporal evolution and convergence behavior [16].

Under this specific form for δ_{it} , the null hypothesis of convergence for all i , takes the form: $H_0: \delta_i = \delta, \alpha \geq 0$, while the alternative hypothesis of non-convergence for some i , takes the form: $H_1: \delta_i \neq \delta$ or $\alpha < 0$. The regression model of the log t -test is:

$$\log\left(\frac{H_1}{H_t}\right) - 2\log L(t) = \beta_0 + \beta_1 \log t + u_t$$

for $t = [rT], [rT] + 1, \dots, T$ and $r > 0$. In this equation $H_t = \frac{1}{N} \sum_{i=1}^N (h_{it}-1)^2$ and $\beta_1 = 2\alpha$. Here h_{it} is obtained by as follows:

$$h_{it} = \frac{DR_{it}}{\frac{1}{N} \sum_{i=1}^N DR_{it}} = \frac{DR_{it}}{\frac{1}{N} \sum_{i=1}^N \delta_{it}}$$

Under the null hypothesis of convergence, the dependent variable diverges whether $\alpha > 0$, or $\alpha = 0$. In this case, we can test the convergence hypothesis by a t test of the inequality, $\alpha \geq 0$. The t test statistic follows the standard normal distribution asymptotically and is constructed using a heteroskedasticity and autocorrelation consistent standard error [17].

As PS explain, the convergence hypothesis can be tested using the β_1 coefficient. Specifically, the null hypothesis would be convergence across all provinces, and the alternative would include no convergence and partial convergence among subgroups of provinces. For instance, at the 5% level, the null hypothesis of convergence may be rejected if $t_{\beta_1} < -1.65$. As the t -statistic of the test refers to the coefficient β_1 of the log t regressor in the equation, the test is called the log t convergence test. The interpretation of the results can change depending on whether the estimated parameter is $0 \leq \beta_1 < 2$ or $\beta_1 \geq 2$. In the case that $\beta_1 \geq 2$, the common growth component μ_t follows a random walk with drift, or a trend stationary process. Thus, large values of β_1 would imply convergence in the level of divorce rates across provinces. However, if $0 \leq \beta_1 < 2$, this convergence corresponds to conditional convergence, in which the path (not the level) of divorce rates converges over time across the provinces within the club [1].

C. Sample and Data

The analysis was carried out at the provincial level. For this purpose, crude divorce rate data for 81 provinces of Turkey for the period 2001-2021 obtained from the online database of TURKSTAT were used. Crude divorce rate refers to the number

of divorces per thousand people. Since the number of divorces will change depending on the population of the settlement, this indicator is more suitable for the purpose. The sample period does not go beyond 2001, as the data presented online by TURKSTAT starts from this date.

IV. RESULTS

Table 1 shows the results of applying the cluster algorithm to the sample of provinces. The club column shows the number of provinces that are members of each group. The table also presents the distribution of provinces within groups.

Table 1. Provincial convergence clubs for divorce rate

Club	# Members	$\hat{\beta}_1$	t-statistic
1	18	0.1505	0.7126
2	14	0.2289	2.4239
3	36	-0.0833	-1.0168
4	13	0.9371	5.8669
Club 1	1,7,9,10,16,17,33,35,38,39,41,48,51,59,62,70,80,81		
Club 2	11,14,20,22,26,31,32,44,45,46,55,57,64,79		
Club 3	2,3,5,6,8,15,18,19,21,23,24,25,27,28,34,36,37,40,42,43,50,52,53,54,58,60,61,66,67,68,71,74,75,76,77,78		
Club 4	4,12,13,29,30,47,49,56,63,65,69,72,73		

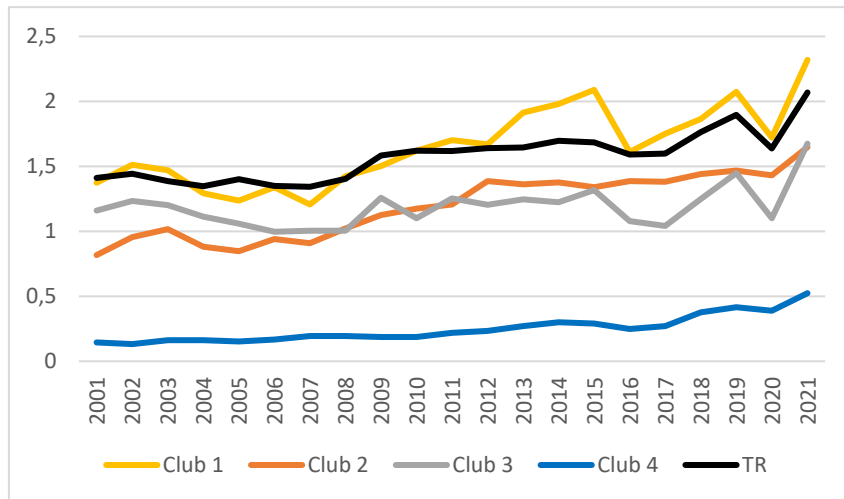


Figure 4. Average divorce rates by converge clubs (2001-2021)

For the period of 2001-2021, the findings suggest that Türkiye's provinces-level divorce rates do not converge in only one overall convergence club. The algorithm classifies provinces into four groups, revealing four different patterns of divorce behavior in Türkiye. In each group, the estimated coefficient

$\hat{\beta}_1$ is significant, strongly supporting the club classification. Furthermore, $\hat{\beta}_1$ is lower than 2 for the cases of Club 1 and 3, providing evidence of a conditional convergence in the path (not in levels) of divorce rates across provinces within each of the clubs. The highest number of provinces has been

grouped into Club 3 (36 members), whereas Club 2 and 4 has a similar number of members. To identify the differences among the convergence clubs, we have plotted the average divorce rate by club, in Figure 3, for the period 2001–2021. Club 1 includes provinces that have highest divorce rates, on average, in the entire period, since it is observed that the average divorce rate of Club 1 is above the average divorce rate of all provinces. This figure reveals that the divorce rates of Club 2 and 3 are close to each other. At the beginning of the sample period, the values of Club 4 were close to those of Club 2 and 3 but diverged over time. It should be noted that all provinces analyzed are classified in one of the four convergence clubs, that is there is no distinct province.

Club 4 with the fewest members exhibits a different behavior compared to the other three clubs, with relatively low divorce rates. While there is no geographical concentration in other groups, most of the provinces in this group are from eastern and southeastern Anatolia. On the other hand, it is striking that Club 1 and 3 show almost parallel behaviors over time but at different levels. Again, there are similarities between Club 2 and 4. Divorce rates in the provinces in these two groups seem to have been unaffected by the shocks that hit the other two groups hard in 2016 and 2020 (the first one was the year of political upheaval and the second one was the year that the COVID-19 pandemic is in affect).

It is also worth mentioning that the speed of convergence is relatively slow for the Club 3. This information can be gathered from the estimated parameter value ($\hat{\beta}_1$) which is twice the value of α , the speed of convergence towards the average, and $\alpha \geq 0$ in the case of convergence. Regarding overall divorce rates, the last group records a value of $\alpha = 0.469$ which more than twice as fast as Club 1 and 2. So, convergence is faster among the members of this group, implying that they are approaching one another more rapidly in relative terms.

V. CONCLUSION

Divorce is a multifaceted issue that most countries around the world are suffered from. Declining marriage rates accompanied by rising divorce rates threaten most societies both socially and economically. In this study, the issue of whether there is a common tendency and converging behavior in divorce rates at the provincial level in

Türkiye is investigated by examining the evolution of province-level divorce rates in the period of 2001–2021. To this aim, a cluster algorithm developed by [13] has been utilized.

Empirical results suggest that in Türkiye the province-level divorce rates do not converge in only one convergence club; rather, we can identify four divorce convergence groups in the period 2001–2021. The provinces within these clubs converge in the path of their divorce rates, but not in the level. When the behaviors of the four groups are examined over time, similarities are seen in pairs. A group that mostly consists of eastern provinces differs significantly from other groups with relatively low divorce rates. The common behavior exhibited by all groups is an upward change over time.

This result points to the determining effect of local characteristics on divorce decisions in Türkiye. From this point of view, it can be said that it is important to take local characteristics into account in policies to be created to reduce divorce rates, and not to ignore the effect of the general upward trend.

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APPENDIX: Provinces by rank codes and clubs

	Club 1	Club 2	Club 3	Club 4	
1	Adana	28	Giresun	55	Samsun
2	Adıyaman	29	Gümüşhane	56	Siirt
3	Afyon.	30	Hakkâri	57	Sinop
4	Ağrı	31	Hatay	58	Sivas
5	Amasya	32	Isparta	59	Tekirdağ
6	Ankara	33	Mersin	60	Tokat
7	Antalya	34	İstanbul	61	Trabzon
8	Artvin	35	İzmir	62	Tunceli
9	Aydın	36	Kars	63	Şanlıurfa
10	Balıkesir	37	Kastamonu	64	Uşak
11	Bilecik	38	Kayseri	65	Van
12	Bingöl	39	Kırklareli	66	Yozgat
13	Bitlis	40	Kırşehir	67	Zonguldak
14	Bolu	41	Kocaeli	68	Aksaray
15	Burdur	42	Konya	69	Bayburt
16	Bursa	43	Kütahya	70	Karaman
17	Çanakkale	44	Malatya	71	Kırıkkale
18	Çankırı	45	Manisa	72	Batman
19	Çorum	46	Maraş	73	Şırnak
20	Denizli	47	Mardin	74	Bartın
21	Diyarbakır	48	Muğla	75	Ardahan
22	Edirne	49	Muş	76	Iğdır
23	Elâzığ	50	Nevşehir	77	Yalova
24	Erzincan	51	Niğde	78	Karabük
25	Erzurum	52	Ordu	79	Kilis
26	Eskişehir	53	Rize	80	Osmaniye
27	Gaziantep	54	Sakarya	81	Düzce