

Examining entry and exit rates of poverty in Turkey: A dynamic probit regression analysis

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Abstract

Purpose — The purpose of this study is to add to the current poverty dynamics literature by investigating the underlying causes of poverty persistence in Turkey, with an emphasis on both entry and exit rates.

Methods — The study analyzes data from the Turkish Statistical Institute's "Survey on Income and Living Conditions" from 2018 to 2021 using dynamic probit models. This large dataset, which gives a detailed picture of socioeconomic situations, helps in properly understanding the complex aspects influencing poverty rates.

Findings — The analysis reveals significant poverty persistence in Turkey, influenced by factors such as gender, marital status, employment, and health conditions. According to the research, these variables frequently interact, forming a complex structure that maintains poverty throughout the country.

Implications — The findings necessitate targeted interventions to address persistent poverty, considering the diverse influencing factors. This could lead to a reduction in poverty rates and improved socioeconomic conditions for individuals.

Originality/Value — This study offers a unique perspective on poverty dynamics in Turkey, focusing on both entry and exit rates. It provides valuable insights for those formulating policies or strategies aimed at poverty reduction, emphasizing the need for a comprehensive approach to poverty alleviation.

Keywords — Poverty dynamics; state dependence; poverty durations; poverty persistence; probit model.

Introduction

The study of poverty and its causes has long been an important area of research in the field of social sciences. One aspect that has gained attention in recent years is the phenomenon of "state dependence" in poverty. This refers to the extent to which experiencing poverty in the present increases the likelihood of experiencing poverty in the future. The other aspect is unobserved heterogeneity, where unmeasured characteristics or circumstances influence an individual's poverty status (Justino & Litchfield, 2003; Wooldridge, 2002). The concept of "poverty persistence" is a complex issue that can be brought about by a variety of issues, such as a lack of education and experience, restricted access to employment opportunities, social exclusion, and insufficient welfare systems. It has an immense adverse effect since it can lead to a cycle of poverty that lasts from one generation to the next.

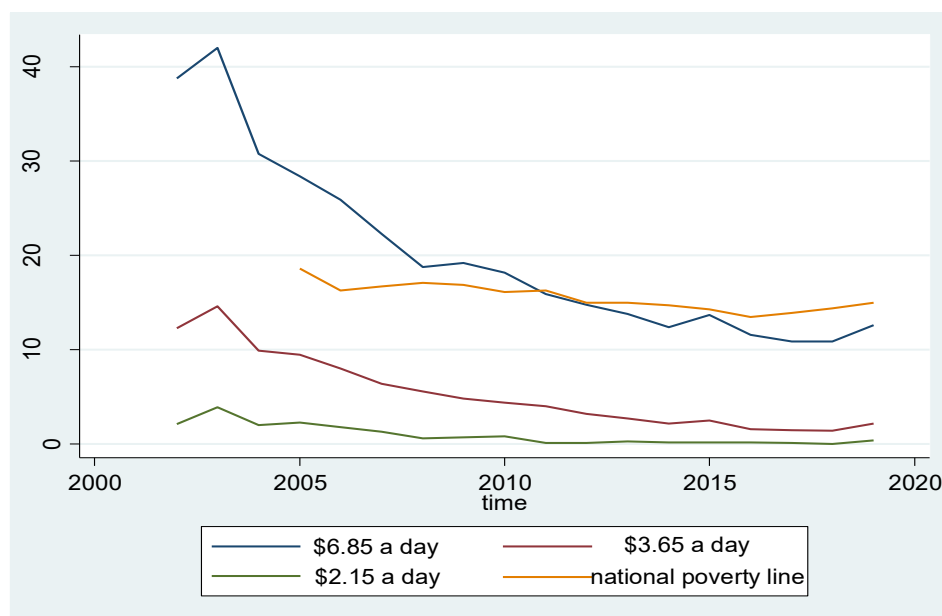
According to literature on poverty persistence and state dependency, poverty is a dynamic phenomenon that is influenced by prior experiences and choices as well as current social and

economic circumstances. Stevens' (1999) work on poverty measurement has led to a growing recognition of the significance of assessing poverty persistence, which involves considering an individual's likelihood of both exiting and returning to poverty throughout their lifetime.

Entry and exit rates of poverty play a crucial role in understanding the transient nature of poverty versus its chronic or persistent state. Studies such as (Bane & Ellwood, 1986; and Stevens, 1999) have emphasized the importance of understanding these rates to shed light on the dynamics of poverty spells and their durations. Buddelmeyer and Verick (2008), examine the factors affecting poverty dynamics in Australian households, highlighting the roles of education, employment, disability, geographic location, and significant life events like separation. Bigsten and Shimeles (2008), delves into Ethiopia's poverty dynamics from 1994 to 2004, emphasizing the recurrent transitions households experience in and out of poverty. The study underscores that prolonged spells in poverty intensify the challenges of escaping it, with notable disparities between male- and female-headed households.

Several recent studies have focused on Turkey's ongoing poverty. Even though substantial progress has been made in reducing poverty over the past 20 years, the issue persists, especially in rural areas and among certain demographic groups. The persistence of poverty in Turkey has been studied using a variety of econometric methods, including static and dynamic models (Şahin & Kılıç, 2021; Şeker & Dayioğlu, 2015; Yildirim et al., 2018).

In the past two decades, the Turkish government has made significant efforts to alleviate poverty and enhance economic well-being. The Conditional Cash Transfer Program has been a key initiative that provides financial assistance to families with children, the elderly, and disabled people. The government has also invested in education and infrastructure development, such as expanding access to preschool education and improving transportation systems. Additionally, policies like special economic zones and tax incentives have created job opportunities and improved the overall economic status of the population. These efforts have yielded positive results, but more work is needed to ensure equal access to necessities and opportunities for all citizens.



Source: World Development Indicators (World Bank)

Figure 1. Poverty headcount ratio (2017 PPP) (% of the population).

According to the World Bank, Turkey has made significant progress in reducing poverty over the past 15 years, thanks in part to robust economic growth, which has averaged over 5% annually during this period. In addition, monetary assistance programs implemented after the 2001 economic crisis may have contributed to this positive trend.

Despite these improvements, however, Turkey's poverty rate is still higher than the average for OECD countries. This suggests that some poverty may have become chronic and that more

permanent policies are needed. Hence, there is a need to ensure the long-term stability of key macroeconomic indicators such as economic growth, unemployment, and inflation, to combat poverty persistence and state dependence.

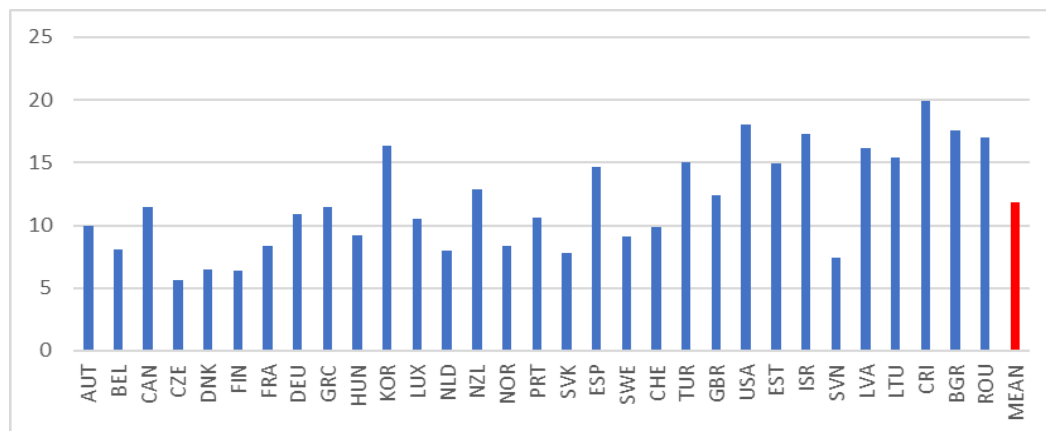


Figure 2. Poverty Rate (OECD Members). Source: OECD (2020).

Regarding the factors that contribute to the country's persistent poverty, there is still much to understand. By employing a dynamic probit regression model to analyze the dynamics of income poverty and considering a variety of aspects, including demographic factors, this study aims to contribute to the literature on the persistence of poverty in Turkey. The dynamic probit regression model is preferred in the study for a variety of reasons. First, it effectively captures state dependency by allowing the inclusion of lagged dependent variables. This is significant in demonstrating how earlier experiences with poverty may affect the current situation. Second, unobserved heterogeneity, a prevalent issue in studies of poverty, may be successfully addressed by the model. It enables this by accounting for individual fixed effects that account for individual-specific influences on poverty. The inherent flexibility of the dynamic probit model, which enables it to precisely represent the probability of the natural transitions that households go through into and out of poverty based on both observed and unobserved factors, is another important advantage of the model. In this study, I analyze entry and exit rates of poverty among households based on their characteristics.

The roots of persistent poverty often lie in income inequality, educational limitations, poor health, and restricted access to resources (Klasen, 2008; Ravallion, 2011). As shown in the existing literature, these drivers manifest differently across developing and developed countries, and understanding these dynamics is vital for effective policy interventions.

Research in developed countries has identified key mechanisms underlying poverty persistence, such as state dependence, initial conditions, and household characteristics (Ayllón, 2013; Ayllón & Gábos, 2017; Biewen, 2009; Bosco & Poggi, 2019; Cappellari & Jenkins, 2002; Devicienti & Poggi, 2011; Fusco & Islam, 2020; Giarda & Moroni, 2018). For instance, Fusco and Islam (2020) underscored the relationship between household size, poverty, and its persistence over time, highlighting the complexity of poverty dynamics.

Parallely, studies in developing countries have highlighted various contributors to poverty such as educational levels, employment instability, asset ownership, and household demographics (Alia et al., 2016; Garza-Rodriguez et al., 2021; Kadir & McKay, 2005; Kudebayeva, 2018; Ribas & Machado, 2007; Roberts, 2000; You, 2017). Notably, You (2017) emphasized the role of asset-based poverty traps in rural China, which is a critical factor to consider in other developing economies like Turkey.

Literature on poverty dynamics within Turkey is abundant (BaşakDalgıç AytekinGüven, 2015; Şahin & Kılıç, 2021; Şeker & Dayioğlu, 2015; Şeker & Jenkins, 2015; Yildirim et al., 2018). It outlines the significance of labor market characteristics, socio-economic factors, and demographic factors in determining poverty entries and exits.

To conclude, although there exists a wide array of research exploring poverty dynamics, there remains a gap in the thorough analysis of poverty's entry and exit rates, especially within the specific context of Turkey. This study seeks to address this issue by employing a dynamic probit regression model to explore the root causes and persistent nature of poverty in Turkey.

The remainder of this paper is organized as follows: Section II provides a review of the literature. In Section III, I outline the methodology for analyzing poverty persistence. Section V reveals our empirical findings and contains a discussion of their importance. Finally, Section VI concludes.

Method

This study, which deals with the dynamic poverty process, uses the "Income and Living Conditions Survey" provided by the Turkish Statistical Institute (TUIK). Since 2006, the "Survey on Income and Living Conditions (SILC)" has been conducted as part of the European Union (EU) studies to determine the distribution of income between households and individuals, to measure the living conditions of individuals, and to reveal social exclusion and poverty in Turkey.

Table 1. Descriptive Statistics

Dependent variable (Y)	=1 if household poor	0,26	0,438	0	1
Number of persons living in the same house		2,55	1,18	1	13
Household Head Characteristics					
Age	Age (in years)	50,7	15,9	15	109
Female	=1 if female	0,275	0,446	0	1
No Education		0,156	0,363		
Primary-Secondary School	=1 if primary and secondary education	0,497	0,5	0	1
High school	=1 if high school	0,094	0,292	0	1
Vocational High school	=1 if vocational high school	0,076	0,265	0	1
University and above	=1 if university and higher degree	0,175	0,38	0	1
Single	=1 if single	0,22	0,414	0	1
Married	=1 if married	0,78	0,414	0	1
Skilled worker	=1 if skilled	0,94	0,228	0	1
Unskilled worker	=0 if unskilled	0,6	0,228	0	1
Wage Earner	=1 if earns wage	0,73	0,443	0	1
Bad health	=1 if the health problem	0,376	0,484	0	1
N=80527					

Source: Author's calculation based on the data.

According to TUIK, households below the threshold determined by median income are defined as poor. This limit can be determined according to 50% or 60% of the median income. Based on Şeker and Dayioğlu (2015) and Yildirim et al. (2018), the poverty line in this study is calculated at 60% of the median income and the unit of analysis in this paper is "household". The study uses a panel data set covering the years 2018-2021.

Table 1 presents descriptive statistics. Accordingly, households classified as "poor" in the period under review, constitute 26% of total households. The average household size is 2,55 and the average age is 50,7. Descriptive statistics show that 27.5% of household heads are women. Moreover, 15.6% of household heads have no schooling, while 49.7% have primary or secondary education. In terms of schooling, about 9% of the household heads have a regular high school diploma, and 7.5% have completed vocational school. The remaining 17.5% have a university degree or higher education.

It can be seen that 22% of the population is single, while the majority (78%) is married. Moreover, a large part (94%) of the population is skilled workers and only a small part (6%) is unskilled. In terms of occupation, 73% of the population are wage earners, while 26% are employers. The data also show that 37.6% of the population reported poor health.

Table 2. Poverty Transition Matrix

Previous Year	Current Year	
	Not Poor	Poor
Not Poor	90,97	9,03
Poor	28,56	71,44
Total	74,6	25,4

Source: Author's calculation based on the data.

Table 2 provides an overview of the poverty status of Turkish households at time t based on their status at time $t-1$. The data show that 38.56% of those who were poor at time $t-1$ can escape poverty in the following year, leaving 71.44% of those who were poor at time $t-1$ still living in poverty at time t . The data also show that the poverty status of those who were poor at time $t-1$ is higher than that of those who were poor at time $t-1$. In contrast, 90.97% of those who were not poor at time $t-1$ remain non-poor at time t . The data also show that 9.03% of those who were not poor at time $t-1$ newly enter poverty.

Previous sections have put forth the idea that poverty is a dynamic occurrence rather than a static one, a notion backed by existing research. Utilizing a dynamic perspective in poverty analysis offers decision-makers a deeper understanding of poverty's enduring nature, thereby addressing the shortcomings of a static approach. This strategy enables decision-makers to concentrate on the causes of poverty rather than only treating its symptoms, which can help in the development and application of more efficient strategies for eradicating poverty (Baulch & Masset, 2003; Cappellari & Jenkins, 2002; Tran et al., 2015).

To examine the dynamic structure and persistence of poverty, this study utilizes dynamic probit regression. We can express the dynamic regression model as follows:

$$y_{it}^* = \gamma Z_{it} + \rho y_{it-1} + c_i + u_{it} \quad (1)$$

where y_{it}^* represents the poverty status of household i ($i=1...N$) at time t . Additionally, y_{it-1} denotes the poverty status in the previous year. The poverty status is determined by a set of time-varying explanatory variables, Z_{it} , which are considered exogenous, given the unit-specific time-constant unobserved effect, c_i . The idiosyncratic error term is denoted by u_{it} .

The initial conditions issue arises in the equation due to the potential for individuals' poverty status observations to begin before the first wave of observation. This could cause a correlation between the starting value of the dependent variable and unobserved individual differences, leading to biased estimates of heterogeneity and genuine state dependence if not properly addressed. To tackle this issue, various approaches have been proposed in the literature, including those by (Biewen, 2009; Heckman, 1981; Rabe-Hesketh & Skrondal, 2013; Wooldridge, 2005). In this research, I used the methods developed by Heckman (1981) and Rabe-Hesketh and Skrondal (2013). By applying both models and comparing their coefficients, we assess the robustness of the estimators obtained in this study.

To model the unit-specific unobserved effect, c_i , we adopt the framework proposed by Rabe-Hesketh & Skrondal (2013).

$$c_i = \alpha_0 + \alpha_1 y_{i0} + \bar{Z}_i \alpha_2 + Z_{i0} \alpha_3 + \alpha_i \quad (2)$$

Accordingly, c_i can be expressed using the initial values of the outcome (y_0), the time-varying explanatory variables (Z_{i0}) and unit-specific time-constant error term (α_i), as shown in equation 1.

Results and Discussion

To examine the dynamic process and persistence of poverty, I have constructed the following model. Here, household-head-specific demographic variables are included.

$$Poverty = Poverty_{t-1} + \beta_0 + \beta_1 household\ size + \beta_2 age + \beta_3 sex + \beta_4 martialstatus + \beta_5 education + \beta_6 skilledworker + \beta_7 wageearner + \beta_8 health \quad (3)$$

Table 3. Results of Dynamic probit models

VARIABLES	R-S (2013) Model	Heckman (1981b) Model
poverty	0.634*** (0.050)	0.462*** (0.086)
age	-0.012 (0.016)	-0.016*** (0.003)
hhsz	-0.486*** (0.044)	-0.443*** (0.042)
sex	-0.297*** (0.0373)	-0.284** (0.137)
martialstatus	-0.277 (0.170)	-0.552*** (0.141)
education	-0.387*** (0.017)	-0.476*** (0.043)
skilledworker	-0.287*** (0.044)	-0.425*** (0.124)
employer	-0.164** (0.069)	-0.549*** (0.087)
badhealth	0.260*** (0.035)	0.199* (0.094)
Initial Conditions		
1.poverty__0	1.594*** (0.082)	
age__0	-0.018 (0.034)	-0.000 (0.003)
hhsz__0	0.095** (0.044)	-0.344*** (0.048)
wageearner__0	0.164** (0.079)	-0.412*** (0.100)
martialstatus__0	0.283* (0.167)	-0.535*** (0.119)
Within-unit averages		
m__age	0.014 (0.038)	
m__hhsz	0.079 (0.075)	
m__wageearner	-0.598*** (0.132)	
m__martialstatus	-0.127 (0.286)	
Constant	1.287*** (0.135)	2.664*** (0.385)
Observations	36,961	58,292
Number of groups	18,987	
LR test of rho = 0: prob		$\chi^2 = 20024.98$ 0.000

Robust standard errors are in parentheses. *** and ** indicated statistically significant at 1%, and 5%, respectively.

The results of the two estimated models are shown in Table 3. The first model yields robust standard errors. The second model is statistically significant overall according to the chi-square test. Both models have similar coefficients. Accordingly, the coefficient of poverty in the table

represents the lagged value of the dependent variable and is an indicator of state dependence. A positive value for this coefficient indicates the existence of significant dynamics associated with genuine state dependence in both models.

The output table presents the coefficients for the control variables that are used in the analysis. Accordingly, the analysis shows that households with a female head of household have a lower risk of poverty, and households with a married head of household also have a lower risk of poverty. On the other hand, poor health is associated with a higher risk of poverty. In addition, households with a head of household who is an employer (as opposed to an employee) have a lower poverty risk, while households with an employee as head of household have a higher poverty risk.

Table 4. Entry and Exit Probabilities of Poverty

		Entry probability (%)	Exit probability (%)	Steady-state probability (%)	Mean Duration
Education Level	No Education	27.1	57.1	32.1	1.749
	Primary-Secondary Education	19.3	67.3	22.3	1.484
	General High School	13.1	76	14.7	1.314
	Vocational School	8.4	83.2	9.2	1.201
	University and above	5	88.8	5.3	1.126
Sex	Male	15.3	74.9	17	1.334
	Female	19.4	69.4	21.8	1.440
Marital status	Single	20	68.2	22.7	1.466
	Married	17.3	71.7	19.4	1.393
Occupational Skill	Skilled	17.5	71.5	29.7	1.398
	Unskilled	22.2	65.4	25.3	1.528
Employer	Wage Earner	18.7	70	21	1.427
	Employer	16.3	73.1	18.3	1.367
Health Condition	Good	17.4	71.6	19.5	1.394
	Bad	21.4	66.4	24.3	1.504

The probabilities of entering and exiting poverty for demographic factors are shown in table 4. Accordingly, individuals with higher levels of education have a lower probability of entering poverty and a higher probability of exiting poverty than those with lower levels of education, according to the statistics. Individuals with a university degree or higher have the lowest chance (5%) of falling into poverty and the greatest chance (88.8%) of escaping out of it. Individuals with no educational attainment, on the other hand, have the greatest probability (27.1%) of entering poverty and the lowest probability (57.1%) of exiting poverty. These results highlight the significance of education in poverty reduction and imply that policies to improve educational opportunities and attainment may be effective.

The entry and exit probabilities of men and women into and out of poverty indicate that poverty rates differ between the sexes. Women have a greater probability of falling into poverty than men. At the same time, women, are less likely than males to move out of poverty, implying that once in poverty, they are less likely to move out. A variety of factors may contribute to these disparities, including unequal access to education, job opportunities, and social support. Addressing these factors through tailored policies and programs could help reduce male and female poverty rates. Both single and married people are at risk of falling into poverty, but the likelihood is greater for single people. However, married people have a greater likelihood of escaping poverty. Our findings reveal a pronounced and positive coefficient of state dependence, aligning with prior research such as those by Şahin and Kılıç (2021), Şeker and Dayioğlu (2015), and Yildirim et al. (2018). This indicates a consistent trend of persistent poverty in Turkey.

Individuals with occupational skill have a lower poverty entry probability and a higher poverty exit probability compared to those with unskilled workers. The probability of falling into poverty is a little greater for wage earners. Yet, they have a higher probability of escaping poverty. Finally, households with a head in poor health are more likely to experience poverty entry and less

likely to exit poverty than households with a head in good health, indicating that the health condition of the household head plays a significant role in poverty dynamics.

Conclusion

This paper investigates the persistence of poverty in Turkey based on SILC data for 2018-2021. To achieve this objective, we used the random effects dynamic probit model as proposed by Heckman (1981) and Rabe-Hesketh and Skrondal (2013). Our results show a highly significant and positive coefficient of state dependence, which is consistent with the previous studies by Şahin and Kılıç (2021), Şeker and Dayioğlu (2015), and Yildirim et al. (2018). These findings suggest that poverty has a persistent nature in Turkey.

According to the estimation results, poverty dynamics in Turkey are significantly influenced by a complex interplay of key factors, such as gender, marital status, employment, and health status. Findings reveal that individuals with higher levels of education and occupational skills have a significantly lower probability of falling into poverty and a greater likelihood of escaping it, when compared to their counterparts with low levels of education and unskilled workers.

Moreover, our analysis has revealed that women are persistently at a disadvantage, with a lower probability of escaping poverty when compared to men. This highlights the urgent need for targeted policies that are specifically designed to tackle gender-based disparities in the incidence of poverty. Additionally, research has shown that the health status of the family head plays a significant role in poverty dynamics, with households headed by individuals with poor health more likely to experience poverty and less likely to exit it.

According to the findings of this research, policies aimed at reducing poverty in Turkey need to focus on specific groups, particularly those at risk of persistent poverty. Gender inequalities in poverty dynamics are necessary to be addressed, particularly for women. Access to affordable health care, education and training programs, and social protection programs could benefit women.

Furthermore, the findings suggest that education and professional abilities are critical to reducing poverty in Turkey. Prioritizing policies that improve access to education and training, especially for vulnerable groups, is essential. Furthermore, policies that promote economic growth and job creation can have a significant impact on reducing poverty in Turkey.

The existing literature on poverty dynamics in Turkey focuses on the role of socio-economic factors, labor market characteristics, and household attributes in determining poverty persistence. In accordance with these studies, findings indicate that gender, marital status, employment, and health status all play a role in poverty dynamics.

This study provides an analysis of poverty dynamics in Turkey by calculating entry rates and exit chances using two benchmark models. The application of two models not only ensures the robustness and accuracy of our analysis but also enhances the validity of our findings by accounting for variations in model specifications. By focusing on entry and exit dynamics, we offer a comprehensive understanding of poverty transitions in Turkey and shed light on the complex processes underlying poverty persistence.

In summary, persistent poverty is a major challenge for Turkey. The findings of this study suggest that targeted policies to reduce poverty, especially for vulnerable groups such as women, those with low levels of education and unskilled workers, and those with poor health, are essential. Investment in education and vocational skills, economic growth and job creation, and access to health services and social protection programs are necessary to reduce poverty and promote sustainable development in Turkey.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

Data Availability Statement

The data that support the findings of this study are available from the “Turkish Statistical Institute”. Restrictions apply to the availability of these data, which were used under license for this study.

Data are available (https://www.tuik.gov.tr/Kurumsal/PDF_Detay) with the permission of Turkish Statistical Institute.

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