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**Time-Use Patterns of Youth in India (2019):
NEET vs. others**

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Abstract

This study analyzes the covariates of the time spent on education and leisure of the youth who are Not in Employment, Education, or Training focusing (NEET). Based on the 2019 Time Use Survey for youth in India the study estimates a two-stage control function to examine the covariates that explain the share of time spent on learning among NEET after accounting for the potential endogeneity of NEET status. The first stage probit model predicts the probability of NEET using average income of, and regional unemployment rate among adults (30-65 years) aggregated by state, district, and education level from PLFS (2018-19) as instruments. The generalized residuals (Inverse Mills Ratio) are then included as an explanatory variable in the second stage GLM with a logit link and binomial family.

The selection coefficient for men and women have opposing signs, suggesting the difference in unobserved characteristics that drive men and women into NEET to explain the gender differentials in time-use patterns in India. The share of time spent on learning among NEET youth is significantly positively associated with better education, urban residence, access to some type of labor-saving technologies in their homes, and residing in Northern India, for both males and females. The study highlights the heterogeneity within NEET youth and underscores the need for policies tailored to their specific characteristics.

Keywords: NEET, Youth Unemployment, Time-Use
JEL Classification Codes: I23, J24, J64, P36

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INTRODUCTION

The term NEET (Not in Employment, Education, and Training) was first used to describe a British labor market situation and the initial term used to describe was Status Zer0 (Instance et al., 1994). They used the term to describe the situation that could not be described by the main categories of labor market status i.e., employment, education, or training. However, the term came into formal use in *Bridging the Gap*, Social Exclusion Unit (1999) as a result of a hostile reaction from the then U.K. government as they wanted to draw attention away from the scrapped unemployment benefits program and wanted to assert personal responsibility (Furlong, 2006).

Furlong (2006) highlighted several advantages and disadvantages of the concept. One major drawback is the lack of consensus on the accepted definition worldwide, thus making international comparisons difficult. On the positive side, the NEET concept includes young mothers and the disabled who are otherwise labeled as idle. The various definitions of NEET exist across the globe as compiled by Elder (2015) and are mentioned in Table A1 in the Appendix.

The various definitions above emphasize the fact that there are different ways in which the concept of NEET has been interpreted across the world. It is likely that a lot of definitions are adopted in order to suit the specific vulnerabilities that exist in those particular countries or regions. For example, the definition used by the Sustainable Development Solutions Network or SDSN (2014) covers only those who are not in formal employment. Since the characteristics of the youth enrolled in education or those who are currently working are largely known, the focus of the current study is mostly on the NEET youth. However, the individuals pursuing education and those who are

employed are also included to make a comparison with the characteristics of NEET youth.

NEET in India

The Indian economy in general and the labor market in particular have some distinct characteristics that are different from the advanced economies and serve as the basis of the conceptualization of NEET in India. These include huge gender gaps in labor force participation (Costagliola, 2021), a weak education system, and a weak social insurance system (Dreze and Khera, 2017; Majid, 2019).

NEET, per the ILO definition in India, is characterized by those who are not in employment (or the unemployed) and those who are not in education and training so that NEET is categorized by Majid (2019) into NEET-Unemployed, which comprises those not in employment, and NEET-OOLF (or Out of Labor Force) consisting of those not in education and training. Parida and Pattayat (2023) highlight that the factors contributing to the growth and persistence of NEET are both at the micro and macro levels. Macro factors include previous stock of the NEET population, MPCE, average daily wages of the regular salaried workers, and social sector expenditure. Additionally, micro-level factors include general and technical education, gender, parents' education, and various socio-cultural factors such as caste and religion. The risks of being in NEET in India are higher for the female youth, illiterate, individuals with no vocational education, and low socio-economic status (Parida and Pattayat, 2023; Bisht and Pattanaik, 2022; Bisht and Pattanaik, 2023; Sinha and Husain, 2022). Although Sinha and Husain (2022) have found the odds of being in NEET to increase if one is married, this might be the case, peculiar to men, as shown by Parida and Pattayat (2023). However, better networked women have higher odds of choosing to pursue higher education rather than staying in NEET (Maheshwari and Viswanathan, 2024).

Given the composition and determinants of NEET in India, we diverge from the existing studies by further characterizing the NEET population based on how they spend their time in various day-to-day activities. Since the majority of NEETs in India are out of the labor force and not in education or training, it is worthwhile to see what are they engaged in and how they spend their time. ILO (2021) has shown that the majority of women who are classified as NEET are not completely idle as a majority of them are involved in domestic duties and caregiving for their households. However, since NEETs are a heterogeneous group (Furlong, 2006) and they are defined as per the socioeconomic contexts (Wong, 2016; ILO, 2019), it is worthwhile to see how the NEET youth spend their time on average. Such an exercise can help us identify more specific characteristics of NEET and identify the various determinants associated with the time spent in those activities. We also examine the time use pattern of the male youth across other activity statuses i.e., education and employment.

TIME-USE: A REVIEW

Historically, in Economics, greater emphasis was laid on the time spent at work until Becker (1965) highlighted the importance of accounting time spent on non-work hours. In addition to Becker (1965), several other economists have shown how the results of various economic studies may be biased when the time factor is ignored. These include Mincer (1963) who highlights how estimates of income elasticity of demand for different commodities may be biased when the cost of time is ignored. Owen (1963) examined in the context of demand for leisure, while Dean (1963) considered the allocation of time between subsistence work and market participation in African economies. The motivating factor behind Becker's (1965) study was to introduce leisure time as a measure of economic welfare in the context of the significant progress

that the world has made in terms of economic development, that hours of work have reduced significantly.

In recent times, time-use data has been used to study labor productivity (Gibson and Shrader, 2018), educational outcomes (Stinebrickner and Stinebrickner, 2004), and gender discrimination in household work and unpaid care work (Ferrant and Thim, 2019; Janiso et al., 2021; Hirway and Jose, 2011, Sridharan, 2021). A significant focus of most of the studies has been on how much time one is able to spare for self-care activities. The presence of time-use data makes available data on various day-to-day activities such as sleeping, leisure, and socializing. The association of sleep with economic outcomes, especially wages, was first examined by Biddle and Hamermesh (1990), although not discussed empirically (Gibson and Shrader, 2018). The relationship has been further a matter of study in Brochu et al., (2012) and Szalontai (2006). Gibson and Shrader (2018) have measured the association between hours of sleep and labor productivity. They have shown that sleeping is more complementary to home production than leisure. Therefore, better sleep was found to be associated with better productivity and better wages. In contrast to this, one expects that the time use among youth will be a diverse set of activities like, learning, sports, cultural, and social interactions for a given primary activity status of in education, or in employment or others.

There also exist a few criticisms regarding specific ways of conducting time-use surveys. Self-reported time-use measures can be unreliable as respondents generally overestimate their time expenditure (d'Amico and Borus, 1984). The time diary approach is believed to minimize these errors. This approach asks respondents to report minute-by-minute accounts of their 24 hours of activities. The Indian Time-Use Survey (2019) is based on a related idea, which we will be utilizing for the current study.

As per Robinson (1977) time allocation can be conceptualized as being determined by personal characteristics, role obligations such as an individual being in education or employment, ecological factors like living arrangements, and resources like labor-saving technology.

d' Amico and Borus (1984) is one of the very few studies that reports time-use estimates for different activity statuses i.e., employed, unemployed, and out-of-labor force. We diverge from them as we segregate the activity status into education (or currently enrolled), employed, and NEET.

In India, the time-use survey was initially carried out on a pilot basis in 1998. It was administered only in six states at that time. The second and most recent survey was carried out in 2019, which is the first nationally representative time-use survey (NSSO, 2019). Despite the limited availability of data, the coverage of the concept of time use in India is wide.

Time poverty, defined as the shortage of time to do purely personal activities, is often ignored in studies based on deprivation. This can often lead to an understatement of the overall deprivation as they do not get captured in the multidimensional measure of poverty (Ghosh, 2001). Non-inclusion of the aspect of time prevents the measuring of aspects such as care work which is generally not looked upon as productive work despite the sector being quite large (Neetha, 2010). Therefore, the advantage of having a Time-use survey helps get a better understanding of the workforce, particularly the productive work done by women in the informal sector of India (Hirway and Jose, 2011). It has been shown that there are significant gender gaps in the time spent on domestic labor (Sridharan, 2021), specifically in care work and non-work (Janiso et al., 2021).

In this study we try to explore how time-use patterns vary across various time-use activities, broadly categorized as within the: System of National Accounts (SNA¹), Extended System of National Accounts (ESNA²), and Non-SNA or non-ESNA (NSNA³). However, our focal point will be the time-use patterns among NEET men and women.

Time-Use and NEET

Given the value that time-use data can provide in getting a better understanding of the workforce and the labor force participation of individuals, it is worthwhile to expand the idea to other labor market measures, such as NEET. Since NEET is a measure of labor market vulnerability among the youth, it can be useful to see how that section of the youth spends their time and the determinants of the time spent. Such an exercise for NEET can help us get a better understanding of the precise characteristics and suit the policy action accordingly, as has been the intent of other time-use based labor market studies. The various labor market studies examined so far have mostly emphasized labor productivity, wages, and so on, while very few studies have focused on the time-use patterns of the NEET youth. Wong (2016) and a study on Turkey (Aktakke et al., 2020) are the few studies that have shed some light on the time-use patterns of the youth. The report based on Turkey study has shown that NEET youth spend most of their time on leisure activities, and household and care work while Wong (2016) makes a comparison of the youth time-use profiles of the youth in Australia and

¹ SNA activities include employment and related activities, and production of goods for own final use.

² ESNA activities include Unpaid domestic services for household members, Unpaid caregiving services for household members, and Unpaid volunteer, trainee, and other unpaid work.

³ NSNA activities include Learning, Socializing and communication, community participation, and religious practice, Culture, leisure, mass media, and sports practices.

Japan. However, to the best of our knowledge, there is no study in India on the NEET youth that has studied their time-use patterns.

We diverge from the existing studies by examining how youth in three different primary activity statuses of education, employment and NEET utilize their time, with a special focus on how the NEET youth spend their time.

The paper is organized as follows. In the next section, we discuss the data we use and the methodology that we have adopted in the current study. This is followed by an overview of the NEET in the data and descriptive statistics of the sample used for the study. Then we present the results from the econometric analysis and move to the conclusion.

METHODOLOGY AND DATA

Data

In this study, we use the first nationally representative Time-Use Survey. It was conducted by the National Sample Survey Organization, spanning January 2019 to December 2019. The TUS covers 138799 households from both urban and rural India. Everyone above five years of age has been covered in the survey where they have been asked how they spent their time in the last 24 hours of the survey and the day before that, in a thirty-minute interval. The days have been further classified as a weekday or a weekend. Further, the data set contains information on household and individual characteristics. Household characteristics include aspects such as religion, social group, sector of residence, household size, and total monthly consumption expenditure. Individual characteristics include age, gender, marital status, level of education, employment status, and demographic information. The time spent on different activities by the respondents has been classified into nine major

divisions as per the International Classification of Activities for Time Use Statistics (ICATUS) (United Nations Statistics Division, 2016).

For the current study, the total time spent by individuals on various activities has been further classified into SNA (System of National Accounts), ESNA (Extended SNA), and NSNA(Non-SNA) activities as mentioned in Neetha (2010). SNA includes all activities that are covered under economic activities in the economics literature while ESNA includes unpaid non-economic activities such as cooking and household work, and care work for the children and elderly. NSNA activities comprise activities that people indulge in for personal consumption such as leisure, sports watching television, social media, etc.

Since our special focus is on NEET, we see that the category is dominated by women. There are various factors affecting the work-force participation and factors which lead young women into NEET which are very different from those affecting male workforce participation. Therefore, we do separate analyses for male and female NEET youth. The present study is confined to male and female youth i.e., men and women in the 15-29 age group.

Methodology

Since we are using Time-Use data where individuals may report 0 time spent on several activities household care activities, Ordinary Least Square (OLS) might yield inconsistent results (Greene, 2003; Cameron and Trivedi, 2005). Since we use the share of time spent on various activities as our dependent variable, using OLS when the dependent variable is a proportion can lead to predictions that exceed 1. Therefore, we use the Generalized Linear Model (GLM) using a logit link and binomial family as suggested in Papke and Wooldridge (1995), discussed further in this section.

Additionally, a person being NEET or not, which is the key independent variable in this study, could be potentially endogenous. Anyone who is not in NEET is either pursuing education or is employed. All these decisions can result from local labor market conditions and potential wages (Giannelli and Monfardini, 2003; Davia, 2004; Pastore, 2012). Thus, NEET status might be correlated with the stochastic error term in (1). In this case, Equation 1 may produce inconsistent estimates. Therefore, we estimate an approximation of the control function approach (Wooldridge, 2015) as our endogenous variable is binary and cannot be directly estimated using a Heckman selection model. Stata, as it assumes the second stage regression model to be OLS.

In the first stage, we estimate a probit model with the binary NEET as a dependent variable. From that, we obtain generalized residuals in the form of an Inverse Mills Ratio (IMR) and use it as an explanatory variable in the 2nd stage Tobit model:

$$\Pr(NEET_i = 1|Z_i) = \Phi(Z_i'\gamma) \quad (1)$$

where Z_i includes, along with other covariates, the instrumental variables such as log of average income (obtained from PLFS data 2018-19 for 30-65-year-olds aggregated by state, district, sector, and highest level of education). From (1) we obtain the generalized residuals (Inverse Mills Ratio):

$$\lambda_i = \frac{\phi(Z_i'\gamma)}{\Phi(Z_i'\gamma)} \text{ if } NEET_i = 1, \quad \lambda_i = \frac{\phi(Z_i'\gamma)}{1-\Phi(Z_i'\gamma)} \text{ if } NEET_i = 0 \quad (2)$$

In the second stage, a Generalized Linear Model (GLM) is estimated, given by:

$$E[Y_i|X] = G(x'\beta + \rho\lambda_i) + \varepsilon \quad (3)$$

Where $G(\cdot)$ is a function satisfying $0 < G(z) < 1$. This ensures that the predicted values if y lie in the interval $(0,1)$. $G(z)$ is chosen to

be a cumulative distribution function $G(z) = \Lambda(z) = \frac{e^z}{1+e^z}$, which is the logistic function with a binomial family. The dependent variable, share of time spent on NSNA, learning, and leisure, is a proportion that ranges between 0 and 1, including boundary values (0 and 1). The GLM model is appropriate for such fractional response variables which include the extreme values 0 and 1, following the approach proposed by Papke and Wooldridge (1996). In the model, it is assumed that y_i follows a binomial distribution:

$$y_i \sim \text{Binomial}(1, p_i) \quad (4)$$

where y_i is the expected proportion of time spent on learning. This expectation is modeled using the logistic function:

$$E(y_i | X_i) = p_i = \frac{e^{X_i \beta}}{1 + e^{X_i \beta}} \quad (5)$$

Such a model is used when the dependent variable is fractional (in our case, the share of time spent on various activities) and includes values of 0 and 1. The coefficients are interpreted in terms of the log of odds. x is the vector of explanatory variables, and λ_i is the generalized residual from the first stage (Equation 1), called the Inverse Mills Ratio.

The explanatory variables are mostly similar to Janiso et al., (2021). However, they are also included since Robinson (1977) suggests that time allocation is mainly determined by personal characteristics, living arrangements, and resources such as having access to labor-saving technology. Personal characteristics are represented by an individual's age (captured by the age group categorical variable), level of education, and marital status. Living arrangements are represented by the household type, place of residence i.e., rural or urban area, and the type of house the household resides in i.e. pucca house or otherwise. Whether

the household that the individual belongs to has access to labor-saving technology is given by the variables sweeping type (if sweeping is done using mechanized or manual methods or outsourced), washing type (if clothes are washed using mechanized or manual methods or outsourced), and cooking fuel (classified as conventional including gohar gas, modern LPG and no such arrangement). To account for one's social characteristics, religion, and caste have also been included as additional regressors. A household's total consumption expenditure is captured by MPCE (monthly per capita expenditure) quintiles, as a proxy for income.

Households have also been divided in to four categories. Type 1 includes having at least one member in the 15-59 age group. Type 2 includes at least one member in the 0-14 age group in addition to Type 1. The households in the Type 3 category comprise of having at least one member in the 60+ age-group in addition to what comprises of Type 2. Finally, Type 4 households comprise any other combination in addition to Type 3. Inclusion of household types can be a useful determinant of time use. This is because a household of a higher type includes individuals who require more care-work, i.e., members belonging to the 0-14 and 60+ age groups. We think that belonging to a certain type of household can have some influence on time spent on SNA and ESNA activities and leisure time in NSNA activities.

To account for regional factors that might be associated with time allocation, we include the *region* variable where the Indian states have been classified into North (Chandigarh, Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Rajasthan, and Uttarakhand), Central (Chhattisgarh, Madhya Pradesh, and Uttar Pradesh), East (Bihar, Jharkhand, Orissa, West Bengal), North-East (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura), West (Dadra and Nagar Haveli, Daman and Diu, Goa, Gujarat, Maharashtra),

and South (Andaman and Nicobar Islands, Andhra Pradesh, Karnataka, Kerala, Lakshadweep, Puducherry, Tamil Nadu and Telangana).

Time-Use Patterns of Youth in SNA, ESNA, and NSNA Activities Across Activity Statuses

Figure 1(c) shows the NEET rate across states in 2019 for both males and females. The incidence of NEET is highest in states like Uttar Pradesh, Bihar, Jharkhand, Rajasthan, and West Bengal. These states are characterized by low GSDP. As per Mehrotra and Parida (2021), these states went through structural transformation as a result of mechanization in agriculture. This resulted in a loss of approximately 4.5 million jobs per annum, while an adequate number of non-farm jobs were not created owing to low levels of industrialization. One reason for high NEET rates among affluent states (based on GSDP) like Kerala and Punjab is the better standard of living, while slow growth of industrial jobs, and growth of low-quality service sector jobs are others (Parida and Pattayat, 2023). A better standard of living allows the better-off states to delay the participation of their youth in the labor market. The young people in these states may be able to wait for favorable labor market conditions offering better wages and employment opportunities. The estimates presented here are based on the Time-Use Survey 2019 and align with the 2018-19 estimates of the Periodic Labor Force Survey (PLFS) (Parida and Pattayat, 2023).

It is also important to examine the NEET rates separately for men and women, as the drivers of NEET differ between men and women. While for men, the unemployment part is dominant (Majid, 2019), it is the engagement in household work, particularly after marriage, which is a major component of NEET among the female youth (Majid, 2019).

Figure 1(a) and 1(b) show the NEET rates across all Indian states (except Ladakh) for male and female youth, respectively. We can see

that the NEET rates among the two genders are very different. This has also been shown in previous research (Majid, 2019). While the NEET rate among males varies between 5-25%, it varies between 30-80% among females. Among males, it is the lowest in states like Maharashtra (6.5 %), Karnataka (5.3%), Telangana (5.3%), and Gujarat (5.7%) and highest in Kerala (15.08%), Uttarakhand (13.5%), Himachal Pradesh (12.7%), and Odisha (13.7%). Additionally, Northeastern states like Nagaland and island territories including Lakshadweep and the Andaman and Nicobar Islands.

Among females, the lowest NEET rates can be found in states like Gujarat, Odisha, and Tamil Nadu. Other than these states, lower NEET rates can also be seen in Ladakh and the Northeastern states. However, for having a precise and careful analysis of female NEET rates, we need to segregate the female NEET rate into unemployed NEET and NEET-Out of Labor Force (OLF). As shown by Majid (2019), the NEET OLF component is dominated by women in India. This exercise can be taken up in future work.

The next section shows the time-use patterns among males and females across various activity statuses, i.e., education, employment and NEET.

NEET Rate across States (Male)

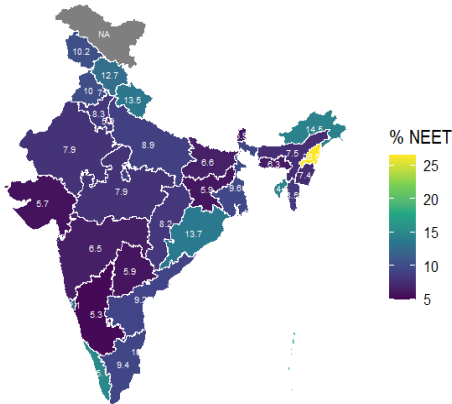


Figure 1(a): NEET Rate among Males

NEET Rate across States (Female)

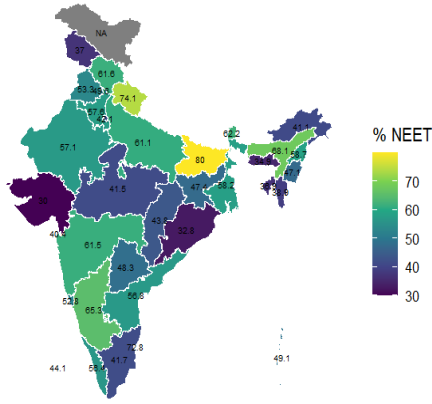


Figure 1(b): NEET Rate among Females

NEET Rate across States

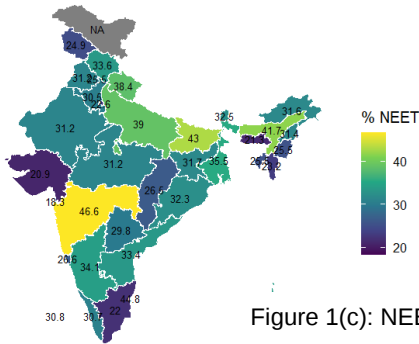


Figure 1(c): NEET rate among Youth

Figure 1: NEET Rate among Youth Across States in India

Time-Use patterns of young men in SNA, ESNA, and NSNA Activities across activity statuses

Table 1 shows the time-use patterns of young men across the three activity statuses, i.e., education, employment, and NEET. NEET includes the unemployed and those not involved in education and training. The

time-use activities are also divided into SNA, ESNA, and NSNA activities (Neetha, 2010). These averages also include individuals who have reported spending 0 minutes in a particular activity.

Men who are enrolled in education, as expected spend majority of their time in learning activities. This is followed by spending time in cultural activities, leisure, and sports. Employed men spend around 425 minutes (7 hours) per day on an average on employment and related activities. This is an expected finding. This is followed by spending (per day) around 133 minutes in socializing, and 106 minutes in leisure related activities.

Table 1: Time-use pattern of male youth across various activity statuses, minutes per day

Time-Use Activity	Male			Female		
	Education	Employment	NEET	Education	Employment	NEET
Employment and related activities (SNA)	16.73	425.11	48.49	8.31	301.78	10.18
Production of goods for own final use (SNA)	7.59	26.92	18.25	6.28	28.57	19.98
Unpaid domestic services for household members (ESNA)	15.15	23.95	47.00	76.82	191.48	332.96
Unpaid caregiving services for household members (ESNA)	3.43	11.89	9.31	5.19	43.96	92.72
Unpaid volunteer, trainee, and other unpaid work (ESNA)	2.04	3.17	5.87	2.07	3.26	1.96
Learning (NSNA)	379.94	3.90	76.41	382.18	7.97	8.82

(Table 1 continued)

(Table 1 continued)

Time-Use Activity	Male			Female		
	Education	Employment	NEET	Education	Employment	NEET
Socializing and communication, community participation, and religious practice (NSNA)	116.81	133.11	205.35	110.36	100.39	124.63
Culture, leisure, mass media, and sports practices (NSNA)	178.81	106.07	249.51	136.80	89.88	134.64
Self-care and maintenance (NSNA)	719.51	705.88	779.82	711.99	672.72	714.05

Source: Author's estimates based on unit record data from NSSO (2019).

Notes: SNA- System of National Accounts; ESNA-Extended SNA; NSNA- Non-SNA as in Neetha, 2010

The highest average time spent by NEET individuals, other than self-care, is on leisure activities (around 250 minutes or approximately four hours) followed by socializing and community participation (around 3 hours). If we compare across the three activity statuses, the highest time spent on leisure activities, and on socializing and community participation is by the ones who are in NEET. These findings are consistent with the NEET report on Turkey (Aktakke et al., 2020), Joung and Joo (2020); Wong (2016). Another interesting observation is the time spent by the NEET men on learning. They spend around 76 minutes on learning activities on average every day. Although it is much lower as compared to time spent on learning by those who are in education, it is interesting because it is counterintuitive to the very definition of NEET, which only includes individuals who are not in education or training. It is 76 minutes when we include NEET unemployed also. If we just focus on NEET (OLF), the average time spent is even higher.

Therefore, before we turn to the econometric analysis to see the determinants of NEET and further how being in NEET is associated with

time spent in learning, we examine the determinants of time-use patterns of male youth.

Results: Descriptive Statistics

Before analyzing the determinants of time-use patterns among youth, we first discuss the descriptive statistics presented in Table 2. As expected, those enrolled in education spend most of their time in non-SNA activities, with a significant portion allocated to learning (51% of the total time by both male and female students). Similarly, those who are employed spend the highest proportion of their time on SNA activities, with males spending 61% of the total time and females spending 42% of the total time. Among NEET youth, males spend most of their time on NSNA activities, while females allocate the largest share of their time to ESNA activities, primarily unpaid domestic and caregiving work (59% for females compared to just 9% for males).

To ensure an accurate representation of the share of time spent on NSNA activities, we exclude self-care, as it constitutes a substantial share of daily time use regardless of an individual's activity status. Including self-care would obscure differences in other NSNA activities.

An important observation is that male NEET youth, on average, spend about 76 minutes per day on learning activities, whereas female NEET youth spend 9 minutes per day. Males NEET spend 49 minutes and females 18 minutes on SNA activities. This includes those reporting zero minutes. When we exclude individuals who report zero minutes, we find that 29% of male NEET youth participate in SNA activities, while 24% engage in learning. For female NEET youth, these figures are 22% for SNA activities and 20% for learning. However, the male-female gap is far less in average learning time (around 300 minutes per day for males and 265 minutes for females) compared to those engaged in SNA activities (229 minutes per day for males and 118 minutes for females). This

suggests that NEET youth who do engage in structured activities prioritize learning over SNA work, with similar patterns observed for both genders.

Next, we examine the composition of each activity status across key explanatory variables, as shown in Table 3. Participation in education declines with age, while employment rates rise. The proportion of NEET youth is highest in the 18–21 and 22–25 age groups, followed by the 26–29 group. Additionally, participation in education increases across higher MPCE quintiles, while employment rates decline with rising income. NEET status is most prevalent in the second MPCE quintile, and although the lowest proportion of NEET youth is found in the fifth quintile, it remains about 1% higher than the share of those in employment.

Overall, NEET youth in the sample primarily belong to lower-income households, with 21.55% in the first MPCE quintile and approximately 23% in the second quintile. These patterns highlight the economic vulnerability of NEET youth, particularly among females who bear a disproportionate burden of unpaid domestic responsibilities and spend less time on learning and SNA activities compared to their male counterparts.

Table 2: Descriptive Statistics: Time Use Variables

Variables	Male				Female			
	Educ- ion	Employ- ment	NEET	All	Educ- ion	Employ- ment	NEET	All
SNA (share of total time)	0.03	0.61	0.10	0.36	0.02	0.42	0.04	0.09
ESNA (share of total time)	0.03	0.05	0.09	0.05	0.12	0.31	0.59	0.43
NSNA (share of total time)	0.94	0.34	0.81	0.59	0.86	0.26	0.37	0.48
Learning (share of total time)	0.51	0.01	0.10	0.19	0.51	0.01	0.02	0.14
SNA								
0 minutes (%)	85.39	7.38	70.96	40.27	86.06	15.69	75.19	70.32
>0 minutes (%)	14.61	92.62	29.04	59.73	13.94	84.31	24.81	29.68
avg. minutes	167.66	485.83	229.96	447.92	104.62	391.83	118.4	216.3
ESNA								
0 minutes (%)	78.71	59.39	60.51	66.31	40.88	11.88	1.77	12.97
>0 minutes (%)	21.29	40.61	39.49	33.69	59.12	88.12	98.23	87.03
avg. minutes	96.56	96.40	157.10	102.36	142.23	270.9	437.1	359.4
0 minutes (%)	15.19	98.05	77.00	66.99	16.45	96.06	95.87	74.62
>0 minutes (%)	84.81	1.95	23.00	33.01	83.55	3.94	4.13	25.38
avg. minutes	438.58	200.75	322.15	431.82	457.41	202.23	265	424.95
Socializing								
0 minutes (%)	11.58	6.38	5.50	8.15	10.25	10.53	7.07	91.59
>0 minutes (%)	88.42	93.62	94.50	91.58	89.75	89.47	92.93	8.41
Avg. minutes	131.81	143.10	142.99	145.67	122.97	112.20	134.13	128.07
Leisure								
0 minutes (%)	92.89	15.42	5.75	11.67	10.22	20.88	16.76	15.71
>0 minutes (%)	7.11	84.58	94.25	88.33	89.78	79.12	83.24	84.29
Avg. minutes	193.01	125.99	151.64	163.36	152.38	113.59	161.75	152.31

Source: Author's estimates based on unit record data from NSSO (2019).

Notes: SNA- System of National Accounts; ESNA- Extended SNA; NSNA- Non-SNA as in Neetha, 2010

Table 3: Descriptive Statistics: Covariates of Time Use Variables

Variables	Male				Female			
	Education	Employment	NEET	All	Education	Employment	NEET	All
Age group								
15-17	46.79	3.93	14.18	19.94	50.42	4.27	3.94	15.89
18-21	39.37	19.45	33.63	27.68	37.52	18.42	19.22	23.78
22-25	11.83	36.62	34.64	27.69	10.15	35.57	38.69	30.91
26-29	2.01	39.99	17.56	24.69	1.91	41.74	38.15	29.42
Education Level								
Not Literate	0.73	9.39	8.19	6.23	1.18	18.94	20.00	15.02
Primary	0.45	5.60	2.77	3.54	0.72	6.18	6.17	4.78
Middle and Sec.	2.99	12.93	7.75	8.98	3.55	11.66	12.42	10.03
Higher Sec.	23.01	23.26	18.14	22.75	22.8	17.85	18.74	19.64
Grad and above	72.82	48.81	63.14	58.5	71.76	45.38	42.68	50.53
Marital Status								
Not married	98.90	52.96	89.29	72.24	97.21	38.18	17.29	40.93
Currently Married	1.10	47.04	10.71	27.76	2.79	61.82	82.71	59.07
Social Group								
ST	8.68	11.15	10.08	10.19	9.29	19.89	9.65	11.12
SC	18.27	21.19	20.35	20.09	16.97	18.93	21.42	19.90
OBC	43.01	42.45	41.37	42.56	40.17	37.11	42.56	41.12
Others	30.04	25.20	28.20	27.17	33.57	24.08	26.37	27.87
Religion								
Hindu	83.61	79.56	79.83	81.02	78.6	83.76	77.31	78.62
Muslim	10.76	15.40	13.84	13.63	13.65	8.57	18.1	15.51
Other	5.63	5.03	6.33	5.35	7.75	7.67	4.59	5.87
MPCE								
Quintile 1	18.18	22.25	21.75	20.77	17.19	24.54	24.77	22.79
Quintile 2	20.62	23.12	22.91	22.22	19.59	20.24	23.79	22.18
Quintile 3	20.26	20.74	20.59	20.56	18.65	18.87	20.81	19.96
Quintile 4	19.92	18.63	18.99	19.12	21.48	16.39	17.84	18.55
Quintile 5	21.02	15.27	15.76	17.34	23.10	19.96	12.79	16.52
Household type								
Type 1	62.41	76.62	74.29	71.40	51.97	60.19	71.44	64.74
Type 2	24.02	11.11	13.54	15.88	26.68	20.55	18.15	20.7
Type 3	5.86	3.06	3.89	4.12	6.49	5.38	4.42	5.09

Type 4	7.70	9.21	8.28	8.60	14.86	13.88	5.99	9.46
Lighting								
Electricity	96.05	94.92	95.95	95.41	97.20	96.43	94.79	95.66
Others	3.95	5.08	4.05	4.59	2.80	3.57	5.21	4.34
Cooking								
Modern	67.52	59.56	64.31	62.77	69.24	61.22	61.44	63.41
Conventional	30.22	39.82	35.2	36.04	28.00	38.4	38.51	35.8
None	2.26	0.62	0.49	1.19	2.76	0.37	0.05	0.79
Sweeping								
Mechanical	2.71	2.06	2.03	2.29	2.59	2.15	1.95	2.14
Manual	93.88	96.72	96.92	95.73	92.93	94.86	97.06	95.67
Outsourced	3.41	1.22	1.05	1.98	4.48	2.99	0.99	2.19
Washing								
Mechanical	11.47	7.65	8.99	9.11	12.98	9.87	8.36	9.77
Manual	86.61	91.63	90.45	89.76	84.69	88.65	91.13	89.11
Outsourced	1.91	0.72	0.56	1.13	2.33	1.48	0.51	1.12
Dwelling								
Pucca	69.84	60.55	67.15	64.39	72.27	61.44	62.4	64.78
Other	30.16	39.45	32.85	35.61	27.73	38.56	37.6	35.22
Sector								
Rural	66.64	70.76	69.92	69.23	58.2	66.42	71.21	67.15
Urban	33.36	29.24	30.08	30.77	41.8	33.58	28.79	32.85
Region								
North	17.52	14.55	16.64	15.78	15.19	15.19	15.19	13.81
Central	26.7	26.68	27.43	26.75	17.74	17.74	17.74	20.45
East	21.17	23.03	23.26	22.39	18.66	18.66	18.66	21.35
North-East	3.33	3.76	3.84	3.61	5.02	5.02	5.02	4.89
West	14.52	15.01	10.84	14.49	16.14	16.14	16.14	15.34
South	16.76	16.97	17.98	16.98	27.25	27.25	27.25	24.16
Total (% share)	35.37	56.29	8.34	100	25.60	15.22	59.19	100

Source: Author's estimates based on unit record data from NSSO (2019).

Notes: SNA- System of National Accounts; ESNA- Extended SNA; NSNA- Non-SNA as in Neetha, 2010

Results from Econometric Analysis

Table 4 shows the QMLE estimates as obtained from Equation 3. The results are from the second stage of the estimation and are limited to the NEET youth. The results are interpreted using log-odds and segregated by gender.

Level of education is included as a categorical variable to examine if the time-use patterns the NEET youth are associated with an individual's level of education. Higher education significantly increases the log of odds of spending time in learning for both males and females. As compared to those with no formal education, the log odds of spending the expected share of time spent on learning is higher for a higher level of education. The log-odds become greater as we move higher in the categories of highest education level. For example, the log-odds of spending a higher expected share of time on learning is highest for those who are at least graduates (3.08) as compared to those with no formal education. However, the magnitudes of the coefficients are higher for males as compared to females. This shows that among NEET, those who are more educated are more likely to spend their time on learning activities, which may include skill-building and self-learning. This suggests that higher levels of education keep the youth engaged in further learning, possibly upskilling themselves to re-enter the labor market. Coming to the share of time spent on leisure, only the coefficient of Graduate and above is significant. A negative log-odds suggests that for NEET youth who are at least graduates, the log-odds of the expected share of time spent on leisure decreases by 0.178 as compared to those with no formal education. This suggests that they are likely to spend much less time on leisure activities.

We do not see any significant effects of marital status for men on the proportion of time spent on learning. However, the effect is negative for women. It suggests that for married NEET women, the log

odds of the expected share of time spent on learning decrease by 1.4. We can say that social norms that expect women to do household chores after marriage can be a reason for the lower likelihood of the proportion of time spent on learning, as compared to women who are not married. We can also see that the log odds associated with the expected share of time spent on leisure is negative for both married men and women. However, the magnitude is lower for female NEET (-0.589). This means that the log odds of the expected share of time spent on leisure activities decreases for both NEET males and females who are married.

As per Robinson (1977), resources such as labor-saving technology are also an important predictor of how the young spend their time. Following that, we have included as categorical variables, the resources that households use for cooking, cleaning, and washing utensils. Such arrangements are classified following Janiso et al., (2021). Cooking fuel is categorized as modern (LPG), conventional (dung, gober gas), and none (no cooking arrangements). The log odds associated with the expected share of time spent on NSNA activities and learning decreases if NEET youth belong to a household having access to conventional cooking methods (-0.454), as compared to modern fuels, while the log odds increases when the cooking method is categorized as none (1.33). None can include outsourcing cooking. Outsourcing food can reduce the share of time spent on household chores and thus more time spent on other non-ESNA activities. However, we do not see any significant effects when the dependent variable is the expected share of time spent on leisure. For females, the log odds for the expected share of time spent on leisure increases when cooking is outsourced (0.85). Given that in the majority of Indian households, women are burdened with the responsibility of cooking, outsourcing of cooking can free some time from household chores and increase the proportion of time spent on leisure. This is also reflected in the negative log odds for NSNA

activities. For females, the cooking method has no significant effect on the expected share of time spent on learning. The results from the use of other labor-saving technologies are also similar and expected.

Other household factors include type of dwelling and urban/rural household. For the expected share of time spent on learning, the log odds associated with other types of dwellings decrease for males (-0.31), as compared to pucca house. A similar result is seen for women in the case of leisure. Residing in a non-pucca house can be indicative of poverty or deprivation. Therefore, the time spent on NSNA activities can be reduced as compared to SNA activities. Coming to rural/urban residence, we see that for both males and females, the log odds associated with the expected share of time spent on learning increase for urban residents (0.33 for males and 0.37 for males).

We have also controlled for regional disparities by dividing the country into various zone i.e., North, Central, East, North-East, and South. As compared to North India, we see that the log odds associated with the expected share of time spent on learning for most other regions decrease. This is true for both males and females. The results are statistically significant only for a few region dummies.

Differential Selection Effects for Males and Females

The Inverse Mills Ratio shows the presence of selection effects into the NEET activity. Since the inverse Mills ratio is significant for both males and females, it suggests strong selection effects. The negative and significant coefficient for males suggests that the unobserved factors that drive an individual into being NEET also reduce the log odds of the expected share of time spent on learning (1.744), while log odds for the expected share of time spent on leisure increase (0.457). However, the opposite is true for females. The unobserved factors that increase the likelihood of women being in NEET also increase the log odds of the share

of time spent on learning and reduce the log odds of the expected share of time spent on leisure.

A possible explanation for the negative IMR coefficient could be that the factors which cannot be directly observed in the data which increase the likelihood of NEET, reduce the time spent on learning among the NEET youth. Such factors could be limited access to informal learning resources, lack of motivation, and discouragement arising out of state dependencies (Arulampalam, 2001; Fougere et al., 2009; O'Higgins, 2017; Ryan, 2001; Skans, 2005). State dependencies refer to a situation where the previous activity status increases the likelihood of being in the same activity status. For example, being in NEET increases the likelihood of being in NEET in the future.

A positive sign is observed for IMR in the case of female NEET youth. One possible reason could be the factors affecting women becoming NEET. Unlike men, women become NEET because of social norms limiting workforce participation. Some female youth may aspire to work or study further but are restricted because of social norms. As a result, these women may continue investing time in learning at home.

Table 4: QMLE Estimates for time spent by youth in NSNA, Learning, and Leisure activities

	Male			Female		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	NSNA	Learning	Leisure	NSNA	Learning	Leisure
Age group (base: 15-17)						
18-21	-0.376*** (0.130)	-1.746*** (0.201)	0.292*** (0.0832)	0.115* (0.0596)	0.126 (0.247)	-0.163** (0.0660)
22-25	-0.382** (0.164)	-1.919*** (0.257)	0.465*** (0.109)	0.0369 (0.0672)	0.277 (0.314)	-0.315*** (0.0752)
26-29	-0.493*** (0.146)	-1.986*** (0.229)	0.295*** (0.0994)	-0.0612 (0.0630)	-0.184 (0.290)	-0.332*** (0.0702)
Level of Education						
Primary	-0.519*** (0.180)	0.750 (0.711)	-0.0897 (0.140)	0.00648 (0.0265)	-0.432 (0.452)	0.0479 (0.0298)
Middle & Sec.	-0.166 (0.148)	1.021** (0.443)	0.0771 (0.0981)	-0.0420* (0.0227)	0.784** (0.387)	-0.0219 (0.0246)
Higher Secondary	-0.188 (0.139)	2.027*** (0.408)	0.0241 (0.0966)	-0.0316 (0.0215)	0.940*** (0.332)	-0.0205 (0.0236)
Grad and above	-0.0501 (0.121)	3.082*** (0.372)	-0.178** (0.0822)	0.0283 (0.0216)	1.817*** (0.308)	-0.0303 (0.0242)
Marital Status (base: Not married)						
Currently married	-0.819*** (0.208)	0.366 (0.329)	-0.295** (0.146)	-0.607*** (0.0708)	-1.410*** (0.360)	-0.589*** (0.0769)
Type of the Day (base: weekday)						
Other	-0.0880 (0.0985)	-0.683*** (0.154)	0.360*** (0.0608)	0.410*** (0.0360)	-0.0751 (0.171)	0.701*** (0.0425)
Household type (base: type 1)						
Type II	-0.131 (0.0923)	-0.306** (0.151)	0.0383 (0.0565)	-0.0374** (0.0169)	-0.106 (0.153)	-0.00432 (0.0191)
Type III	0.0854 (0.142)	0.173 (0.211)	0.0508 (0.0894)	0.0615* (0.0314)	0.480* (0.254)	0.103*** (0.0370)
Type IV	-0.524*** (0.0866)	0.570*** (0.110)	-0.225*** (0.0682)	-0.0139 (0.0283)	-0.0161 (0.142)	0.0352 (0.0290)
Cooking fuel (base: Modern)						
Conventional	-0.109* (0.0663)	-0.454*** (0.110)	0.0418 (0.0420)	-0.131*** (0.0152)	-0.0915 (0.130)	0.0271 (0.0167)
None	0.445 (0.445)	1.327*** (0.302)	-0.361 (0.245)	0.508 (0.532)	0.478 (0.457)	0.849*** (0.316)
Source of Electricity (base: Electricity)						
Other	-0.331*** (0.118)	0.362 (0.247)	-0.0307 (0.0940)	-0.140*** (0.0299)	-0.246 (0.289)	0.0583* (0.0309)
Washing clothes (base: Mechanical)						
Manual	-0.0292	-0.109	0.121**	-0.0474**	-0.317**	-0.0398

	(0.0994)	(0.122)	(0.0608)	(0.0239)	(0.137)	(0.0295)
Outsourcing	0.00992	0.405	0.0957	0.109	-0.606*	0.160
	(0.412)	(0.365)	(0.245)	(0.0877)	(0.329)	(0.0990)
<i>Sweeping (base : mechanical)</i>						
Manual	0.515***	0.600**	0.0200	-0.00598	0.0909	0.106*
	(0.187)	(0.279)	(0.116)	(0.0501)	(0.298)	(0.0569)
Outsourcing	1.051***	1.092***	-0.137	0.308***	0.763**	0.209**
	(0.324)	(0.349)	(0.199)	(0.0811)	(0.347)	(0.0923)
<i>Type of house (base: Pucca)</i>						
Other	-0.235***	-0.309***	-0.0395	-0.115***	-0.192	-0.0838***
	(0.0634)	(0.115)	(0.0439)	(0.0148)	(0.124)	(0.0164)
<i>Sector (base: Rural)</i>						
Urban	0.228***	0.333***	-0.0554	0.0766***	0.367***	-0.0200
	(0.0688)	(0.0897)	(0.0433)	(0.0146)	(0.108)	(0.0170)
<i>Social Group (base Other/ General)</i>						
ST	-0.0266	0.104	0.0903	-0.0398	-0.113	0.0778***
	(0.110)	(0.168)	(0.0688)	(0.0251)	(0.199)	(0.0283)
SC	0.0790	-0.145	0.135***	-0.0628***	-0.392**	0.0210
	(0.0831)	(0.118)	(0.0510)	(0.0191)	(0.154)	(0.0215)
OBC	-0.0217	-0.0381	0.0243	-0.0251	-0.122	0.0368**
	(0.0678)	(0.0981)	(0.0426)	(0.0158)	(0.113)	(0.0177)
<i>Religion (base: Hindu)</i>						
Muslim	-0.00806	-0.218	0.209***	0.0766***	0.367***	-0.0200
	(0.0878)	(0.160)	(0.0565)	(0.0146)	(0.108)	(0.0170)
Others	-0.129	-0.518**	-0.0286	0.0766***	0.367***	-0.0200
	(0.120)	(0.210)	(0.0671)	(0.0146)	(0.108)	(0.0170)
Central	-0.0696	-0.244**	0.155***	0.0929***	-0.529***	0.160***
	(0.0969)	(0.117)	(0.0568)	(0.0225)	(0.167)	(0.0256)
East	0.181*	0.227*	0.125**	-0.0412*	0.0979	0.134***
	(0.104)	(0.129)	(0.0602)	(0.0230)	(0.170)	(0.0256)
North-East	-0.191	-0.440*	0.00208	-0.0802***	0.332	0.0210
	(0.132)	(0.248)	(0.0918)	(0.0301)	(0.255)	(0.0345)
West	0.0989	-0.133	0.135*	0.00592	-0.461***	0.171***
	(0.121)	(0.160)	(0.0730)	(0.0235)	(0.164)	(0.0270)
South	0.269**	-0.223*	0.0630	0.229***	-0.0385	-0.00289
	(0.106)	(0.132)	(0.0584)	(0.0222)	(0.150)	(0.0264)
λ (Inverse Mills Ratio)	-0.0785	-1.744***	0.457**	0.437***	1.845***	-0.230**
	(0.319)	(0.483)	(0.215)	(0.0926)	(0.438)	(0.102)
Constant	1.753***	-0.512	-2.037***	-0.171	-6.073***	-0.932***
	(0.586)	(0.960)	(0.387)	(0.153)	(0.792)	(0.171)
Observations	5534	5534	5534	24231	24231	24231

Source: Author's estimations based on unit record data from NSSO (2019)

Notes: (1) SNA- System of National Accounts; ESNA- Extended SNA; NSNA Non-SNA as in Neetha (2010), and learning and Leisure are components of NSNA

(2) Robust SE in parentheses.

(3) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

CONCLUSION AND LIMITATIONS

As discussed earlier, with time-use data becoming more pervasive, it has been widely used to study economic outcomes such as labor productivity, educational outcomes, and gender-based discrimination in terms of household work and care work. NEET is one such labor market characteristic that is used to examine the extent of vulnerability of the youth in the labor market and time-use studies across the world that are based on NEET have been useful in examining the more precise characteristics of NEET which are often missed out by standard labor force surveys such as the Periodic Labor Force Survey in India.

In the current study, we attempted to examine the determinants of the time-use patterns among the youth, and how they vary across activity statuses i.e., education, employment (non-NEET) and NEET. We found that the NEET status is a key determinant of the time-use patterns across SNA, ESNA, and NSNA activities. We find that as far as the male NEET youth are concerned, they spend most of their time in NSNA activities. A closer look at the NSNA activities shows that learning and leisure are the ones where they spend most of their time on compared to the employed youth, while socializing is less compared to the employed. Other determinants of time use across different time-use activities include personal characteristics such as level of education, age, and marital status. Resources in the form of the presence or absence of labor-saving technology i.e., cooking fuel, sweeping, and washing methods, are also important household-level determinants. Additional household-level determinants include usual consumption expenditure which is used as a proxy for household income, and the place of residence i.e., rural or urban residence.

Since NEET men largely comprise of unemployed so the school-to-work transition of such men is relevant to understanding the

unemployment problem. Most studies on unemployment use the PLFS data (Abraham, 2023; Nath and Menon, 2022; Bisht and Pattanaik, 2023b), and there is no clear understanding of how NEETs spend their time. We also observe that the unobserved factors in the data, which drive women into NEET and are associated with the time spent on learning and leisure, are different than in the case of males.

The study underscores the heterogeneity within the NEET youth. It contributes to the literature by providing an in-depth analysis of time-use patterns among NEET youth in India. It highlights the need for policies tailored to the specific characteristics of NEET youth, particularly those who, despite being classified as out of education or training, are still engaged in learning activities. The inclusion of female youth and a separate analysis can be an important exercise because it is a cause of the wage difference between males and females (Xiang, 2017). Xiang (2017) has further shown that men spending more time socializing also helps them build better social capital. We also see in our results that, irrespective of the activity status, men tend to spend more time socializing. If women, too, have access to similar social capital, it may increase their chances of labor force participation.

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APPENDIX

Table A1: Various definitions of NEET as compiled by Elder (2016)

Excerpts on the NEET concept	Source
Having few individuals who are neither in employment nor in education or training is a sign of a healthy transition from school to work.	OECD (2013)
Young persons not engaged in education, employment, or training, expressed as the acronym "NEET", are being used increasingly in developed economies as a measure of youth marginalization and disengagement. ... The expansion of the focus from unemployment to the broader concept of NEET responds to the need to also consider youth who have given up looking for work or who are unwilling to join the labor market.	UCW (2013)
NEETs are of particular interest to policy-makers as most of them can presumably be considered as facing difficulties in finding a job.	Eurostat (2014)
A high NEET rate as compared with the youth unemployment rate could mean that a large number of youths are discouraged workers, or do not have access to education or training.	ILO (2013a)
Because they are neither improving their future employability through investment in skills nor gaining experience through employment, NEETs are particularly at risk of both labor market and social exclusion.	ILO (2013b)
The concern with NEETs partly results from the fact that this group reflects a growing detachment of young people from the labor market. ... However, youth who are not employed and also not in education or training risk labor-market and social exclusion.	ILO (2012)

The NEET category is made up of three distinct states of employment: unemployment; discouragement; and inactivity, or having left the labor force.	AfDB, et al (2012)
At the European level, the label NEET has an immediate value as an additional indicator to the unemployment rate. This additional indicator eliminates the bias of those still in school and can identify all those who are disengaged from labour market, education or training and who may be potentially mobilised to join the labour market. In this sense, it can be understood as a measure of the level of the joblessness of young people.	Eurofound (2012)
Among standard measures of youth labour market performance, the NEET rate is the one that better reflects the reality of emerging economies by capturing both the risk of unemployment and inactivity. ... For many young people inactivity is the result of discouragement and marginalization, which may reflect the accumulation of multiple disadvantages such as the lack of qualifications, health issues, poverty and other forms of social exclusion.	Quintini and Martin (2014)
This indicator tracks the share of youth who are neither in formal employment nor in full-time education or training. It is a measure of the percentage of youth who are either unemployed, work in the informal sector, or have other forms of precarious jobs.	SDSN (2014)

Source: Reproduced from Elder (2016), Table 1

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