LABOR SUPPLY AND TIME ALLOCATION IN REMITTANCE-RECEIVING HOUSEHOLDS: EVIDENCE FROM RURAL PAKISTAN

by

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Abstract

This paper analyzes how remittance receipts affect labor force participation and daily time allocation of individuals residing in remittance-receiving households of rural Pakistan. In particular, I use the first Time-Use Survey of Pakistan (2007) to assess how members of remittance-receiving households distribute time over market production and its complements, namely, home production, leisure consumption and educational investment. I employ the statistical technique of propensity score matching to find a comparison group for individuals residing in remittance-receiving households. My results indicate that impact of remittances on daily activity sets cannot be analogously identified across genders. Men residing in remittance-receiving households devote less time to market production and consume more leisure. Women, on the other hand, invest more time in home production while maintaining the same level of market production.

List of Abbreviations Used

OPEC Organization of the Petroleum Exporting Countries

KPK Kyber Pakhtunkhwa

PUNJ Punjab

NELM New Economics of Labor Migration theory

PTUS Pakistan Time-Use Survey

PSM Propensity Score Matching

MDU Marginal Disutility

UNSNA United Nations System of National Accounts

RR Remittance Receiving

ATET Average Treatment Effect on the Treated

CIA Conditional Independence Assumption

Acknowledgements

They say to me: "Did you not praise Muhammad (s.a.a.w.),
The Prophet of the God of everything created,
The most worshipable among men?"
I said to them: "What shall I say in his praise
Since his Creator has praised him and has not left anything to say?"

I am forever indebted to Professor Lars Osberg, who made me believe in myself and guided me through the entire process of thesis writing with great patience. His insightful comments, attention to detail and demand for quality work have broadened my intellectual horizon. This thesis would not have been possible without his unwavering support and generous encouragement.

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Chapter 1

Introduction

The most recent census records (1998 Pakistan Population and Housing Census) identify 8% of Pakistan's population as internal or international migrants, which amounts to approximately 14.4 million individuals. Internal migration is, primarily, driven by urbanization. Large cities such as Karachi and Lahore have historically attracted rural immigrants while areas around military cantonments, between Lahore and Peshawar, are also major urban centers (Gazdar, 2003). International migration from Pakistan, on the other hand, took off in the early 1970s as a result of OPEC-induced economic boom. The Gulf region experienced a dramatic increase in demand for unskilled, and later, semi-skilled workers. Pakistan's rural populations, originating from the provinces of Punjab and Kyber Pakhtunkhwa (KPK), fulfilled a sizeable proportion of this demand.

Migration in Pakistan, internal or external, is characterized by maintenance of family bonds and kinship ties (Lefebvre, 1999; Ballard, 2001; Watkins, 2003). Migrants, thus, maintain a tangible connection with their communities through transfer of money and gifts—commonly known as remittances. With the dramatic increase in emigration over the past decades, remittances—internal (often small but widespread)

and international (typically larger but concentrated)—provide an unprecedented potential for rural development (Adams, 1992; Ballard, 2005). Among others, the positive impacts of remittances such as reduction in poverty, increase in entrepreneurialism and improvement in child health and education have been documented (Adams, 2004; De Haas, 2006; Acosta et al., 2007; Hilderbrandt and McKenzie, 2005).

An oft-cited concern in the popular press, however, is that remittances breed a culture of dependency (e.g. Robert Frank, 2001)—that is, remittance receipts make households "lazy" (Azam and Gunert, 2006) so that recipients "simply stop working and wait from month to month for overseas remittance" (Kapur, 2005). Although there is growing evidence[1] that remittance recipients supply less labor yet the causes of this effect remain debated. The New Economics of Labor Migration theory (Stark and Bloom, 1985)—that perceives remittances as part of an intra-family insurance arrangement—provides a labor market supply-side explanation: since work effort of remittance-recipients is hidden from the migrant, thus, insurance against negative income shocks can give rise to a 'moral hazard effect'—non-migrating family members reduce work effort and falsely signal 'bad luck', prompting the migrant to remit funds as required by the insurance contract (Azam and Gubert, 2004). On the other hand, work quantity constraints and local structural obstacles that limit entrepreneurial use of remittance income may also reduce labor force participation—inactivity in this case, however, would originate from the demand-side of the labor market.

In this study I examine the daily time-use behavior of individuals residing in remittance receiving households of rural Pakistan. Since the departure of a family member changes intra-household labor force structure, labor market inactivity may not, necessarily, imply inactivity in general. I, thus, develop a unified framework—using the

[1]For example Rodriguez and Tionsgson (2001), Airola (2005), Cabegin (2006), Acosta (2006), Funkhouser (2006), Kim (2007), Hanson (2007), Grigorian and Melkonyan (2008), Gorlich, Mahmoud, and Trebesch (2010)

first nation-wide Time-Use Survey of Pakistan (the PTUS 2007)—to assess round-the-clock activities of individuals residing in remittance-receiving households. Using terminology proposed by Gorlich et. al. (2010), I divide recipients' daily activities in 4 broad groups—market production, home production, leisure consumption, and educational investment—to capture the incidence of labor market inactivity in a unified context. Remittance-receiving households may not be randomly distributed in the population (for example, only wealthier households may afford migration), thus, I employ a propensity score based matching technique (propensity score matching or PSM, Rosenbaum and Rubin. 1983, 1985) to address endogeniety concerns.

The results of this analysis provide the first empirical investigation of how remittances may affect daily time-allocation of individuals residing in remittance-receiving households of rural Pakistan. Findings suggest that the impact of remittances on daily activity differs across genders. Men residing in remittance-receiving households devote less time to market production and consume more leisure. Women, on the other hand, invest more time in home production while maintaining the level of market production. Educational investment is not affected by remittance income for either men and women (aged 18 – 24 years).

The remainder of the study is structured as follows. Chapter 2 provides an overview of related literature. Chapter 3 develops a simple labor supply-side model that predicts labor market inactivity in presence of remittance receipts; the contrasting case of work quantity constraints is also discussed. Chapter 4 provides a brief description of the dataset and time-use patterns in rural Pakistan. Chapter 5 presents the empirical strategy. Chapter 6 summarizes the results and chapter 7 concludes with policy suggestions.

Chapter 2

Literature Review

Neoclassical migration theory advocates migration as a process to optimally allocate production factors; the process ceases once factor prices are equalized across regions. Under this approach, extensions and modifications of simple wage differential models are considered sufficient to rationalize relocation from agricultural to industrial sectors, a precondition for economic growth (Todaro, 1969). However, this view of migration has no place for income remittances (Taylor, 1999), particularly their impact on the recipient's labor market behavior. The impact of remittances on the recipient's labor supply is analyzed in a separate framework of labor-leisure choice model (Killingsworth, 1983), where remittances would be considered a form of non-labor income. Lacking a unified context, this fails to acknowledge the non-migrating family's financial, and social, role in initiating the migration process—a role that is critical in understanding the migrant's motives to remit funds and the consequent behavior of the recipients.

The new economics of labor migration (NELM) (Stark, 1978; Stark and Bloom, 1985) emerged in the 1980s as a response to these analytical rigidities. NELM saw migration as a household-level, calculated strategy as opposed to an individual "act of desperation or boundless optimism", shifting the focus of migration theory from "individual independence (optimizing against nature) to mutual interdependence (optimizing

against one another)" (Stark and Bloom, 1985). Since, Becker's (1974) work on economics of the family had already opened the 'black box' of the household, it was easy to perceive the migrant and the family locked into implicit contractual arrangements. Altruism and mutual caring were acknowledged as an important component of such familial contracts. However, Lucas and Stark (1985) identified the existence of self-interest in an inextricable relationship with other motives of remitting. They argued in favor of a far richer model of "tempered altruism or enlightened self-interest in which remittances are one element in a self-enforcing arrangement between migrant and home" (Lucas and Stark, 1985). Chami and Fischer (1996) explored this idea further; they suggested that a purely self-interested contract between the migrant and the household can be enforced by altruism—that is, the migrant cares for the family members and so lives up to her commitment.

Considering the household as the unit of analysis allows modelling the family as a financial intermediary that seeks to diversify labor resources in order to minimize income risks and smooth consumption (Chami et. al., 2005). In this context, remittances are returns to household's investments made at the time of emigration. Empirical evidence corroborates this view; remittances are found to protect non-migrating family members from income shocks caused by economic downturns, political conflicts or natural disasters (see, for instance, Fagen and Bump, 2006; Ratha 2003; World Bank 2006a). In one of the first studies of this kind, Stark and Levhari (1982) model an optimizing, risk-averse small-farmer family that evades negative agricultural shocks by emigrating its best member to an urban setting. Gubert (2002) and Agarwal and Horowitz (2002) provide similar models of intra-family risk sharing and co-insurance, where remittances from the migrants are premium payments.

However, the co-insurance perspective of migration-remittance begs the question that, in presence of asymmetric information, does an insurance-mechanism gives rise to

moral hazard? Since non-migrating family members are insured against negative income shocks through remittances, they may secretly reduce work effort required to prevent income losses. Azam and Gubert (2004) provide the first empirical investigation into this phenomenon. They develop a theoretical model that assumes remittances to be part of an implicit contractual arrangement between the migrants and their families. The agreement binds the migrant to remit funds each time the household is unable to maintain a minimum level of consumption. Using an original data set collected in Western Mali, they find an inverse relationship between the reliability of the insurance-mechanism (proxied by the sum of weighted out-migrants divided by the household size) and the household's productive efficiency. Chami, Fullenkamp and Jahjah (2005) posit a similar model characterized by asymmetric information and compensatory income transfers. The model predicts slow economic growth for the remittance-receiving economies, due to a reduction in job search, labor supply or labor effort. Using a panel of countries, they find that "moral hazard problem in remittances is severe."

Findings of most empirical studies support the oft-cited concern that remittance-receiving families have fewer work hours. Rodriguez and Tiongson (2001), Acosta (2006) and Grigorian and Melkonyan (2008) attribute recipient households' lower labor force participation to increased leisure consumption. Hanson (2007) attributes this effect to increased domestic production for the case of women in Mexico's recipient households. Kim (2007) concludes an increase in reservation wage as the primary reason for a reduced labor supply of Jamaican remittance recipients. Gorlich et. al. (2010) find that labor market inactivity, in Moldavian remittance-receiving households, is a result of greater intra-household labor substitution and higher investment in education.

Studies examining the "moral hazard effect of remittances" use measures such as

households' agricultural production to identify effort levels. All else equal, if remittance-receiving households produce less, it means that remittances reduce recipients' effort levels and increase their leisure consumption (see Azam and Gubert, 2004). Others have relied on survey questions that ask respondents to indicate reasons for their labor market inactivity. Inactivity is attributed to leisure consumption if respondents identify reasons that indicate self-chosen unemployment. For example, Gorlich et. al. (2010) proxy leisure consumption by 'voluntary inactivity'. A potential problem in adopting this approach is under-reporting of voluntary inactivity in favor of more 'socially acceptable' excuses. Moreover, migration of a family member changes intra-household labor force structure and often increases domestic responsibilities for those left behind. Thus labor market inactivity does not necessarily imply inactivity in general. Without examining recipients' round-the-clock activities, definite conclusions cannot be drawn.

In this study, I provide a novel approach by suggesting that time can be used to investigate remittance-recipients labor market activity in a unified framework. The patterns in which recipients allocate their daily time over market and non-market production would show up in time-use diaries. Similarly, the time they spend on leisure activities would also be reported. Thus time-use data have the ability to capture any incidence of labor market inactivity in a unified context. Moreover, time-use data also records activities such as 'waiting for employment' (activity codes 188, 288 and 388 in PTUS) and 'travel to seek employment' (activity codes 180, 280 and 380 in PTUS); combining time spent working and looking for work can, thus, also be an ideal metric for work effort.

In the next section, I develop a model—in accordance with the NELM framework of intra-family co-insurance and risk-sharing—that explains labor market inactivity in remittance-receiving households.

Chapter 3

Theoretical Considerations

3.1 Labor Supply with Moral Hazard Effect

The NELM theory suggests that migration is not solely driven by wage differentials. Agricultural to industrial sector migration (both within and across borders) allows rural families to diversify labor resources across independent settings to mitigate the risks of negative income shocks. Since the family collectively invests in the process of migration, non-migrating members expect returns in the form of remittances (Stark, 1991). However, since work effort of remittance-recipients is hidden from the migrant, thus, insurance against negative income shocks can give rise to a 'moral hazard effect'—non-migrating family members reduce work effort and falsely signal 'bad luck', prompting the migrant to remit funds as required by the insurance contract (Azam and Gubert, 2004).[1,2]

[1]In the literature the term *moral hazard* is not used in a uniform manner. Authors have used "moral hazard" to describe informational problems arising from both hidden actions and hidden information. The term moral hazard originates in insurance literature where it arises due to hidden action (when the insurance firm cannot observe the effort level of the insured in preventing loss). On the other hand, hidden information (when the insured has more information than the company at the time when insurance is purchased) results in an informational problem, originally, termed as "adverse selection" (Mas-Colell et al., 1995). I use the term moral hazard in the original sense.

[2]For the sake of simplicity, I ignore the possibility of the migrant assuming opportunistic behavior. Rapoport and Docquier (2005) suggest that the non-migrating members of the household usually have a higher bargaining power; retaliations strategies such as "denying the migrant rights to future family solidarity, inheritance, or return to village for retirement" can be employed. In such cases, the family can sanction its own opportunistic behavior while limiting that of the migrant.

To illustrate this issue, I will present a simple partial equilibrium model adapted from Azam and Gubert (2004) and Rapoport and Docquier (2005). There is only one decision maker: migrant and the household (where "household" refers to the non-migrating part of the family). The household generates its income by investing time in primary, secondary and trade production activities (which I will term as market production). The level of market production is denoted by Y and the amount of time the household employs in achieving this level of market production is denoted by t. Since there are only a finite number of hours per day, thus, there exists an upper bound T such that $t < T$. The time employed in market production also includes time such as travel time to sell services or goods (activity codes 180, 280 and 380 in the PTUS). Thus, it is fruitful to perceive time as the effort the household makes in achieving a certain level of market production. Furthermore, the local production conditions are assumed to be highly unpredictable. For example, excessive rains may destroy crops or the household may fail to sell goods. The productivity of the household is affected by local production conditions. In case of 'bad luck' (such as poor weather), the household's productivity falls while its ability to devote time to market production is unaffected.[3] Explicitly, if α is the productivity level of the household, it can take two values: $\hat{\alpha}$ in ordinary times and $\tilde{\alpha}$ in the case of 'bad luck', where $\hat{\alpha} > \tilde{\alpha}$. This setup can be represented by the following production function:

$$Y = \alpha t \tag{3.1}$$

where $\alpha = \{\hat{\alpha}, \tilde{\alpha}\}$.

Next I want to capture the effect of remittances. Assume that remittances depend

[3]In the case of 'bad luck', the ability of the household to devote time to market production is assumed to be unaffected since the household can continue devoting time to market production even when results are not highly productive. For example, a door-to-door vendor spends travel time even when he or she is unable to sell goods or a daily wage earner can have positive travel time for job search even when he or she cannot obtain employment. Note that the discussion in the following section 3.2, where I consider work quantity constraints, the distinction is basically between small values of t (when the household cannot obtain desired hours of work) and large values of t (when the household can obtain desired hours of work).

on the insurance contract between the migrant and the household where the migrant guarantees a minimum consumption level to the household, Y^{min}. In ordinary circumstances the household is able to meet the minimum consumption level by local production. However, in case of 'bad luck', productivity falls and minimum consumption requirement fails to be met. In such a case, remittances flow-in based on the migrant's evaluation of the gap between the household's income and the income required for minimum consumption. It is important to note that the migrant only observes the level of household's market production; local production conditions, household's productivity level or the time devoted to production are assumed to be hidden from the migrant. Thus, a production level which is lower than minimum consumption signals to the migrant that the household is experiencing 'bad luck' and productivity has, consequently, dropped. Flow of remittances (R) follows the rule:

$$R = Y^{min} - \tilde{\alpha}t \tag{3.2}$$

Given the above information, household consumption can be written as:

$$C = \begin{cases} \hat{\alpha}t + R = \hat{\alpha}t + 0 = \hat{\alpha}t & \text{in ordinary times;} \\ \tilde{\alpha}t + R = \tilde{\alpha}t + (Y^{min} - \tilde{\alpha}t) = Y^{min} & \text{in case of 'bad luck'} \end{cases} \tag{3.3}$$

where $\hat{\alpha}t \geq Y^{min}$. The household enjoys a consumption higher than the minimum level in ordinary times. In the case of 'bad luck', remittances still allow a minimum level of consumption regardless of how low local production falls.

Next I assume that the household maximizes utility in accordance to the unitary

approach of family behavior.[4,5] Using an additively separable form, the household's utility is given by:

$$U(C,t) = \begin{cases} \hat{\alpha}t - \dfrac{\delta}{2}t^2 & \text{in ordinary times;} \\ Y^{min} - \dfrac{\delta}{2}t^2 & \text{in case of 'bad luck'.} \end{cases} \tag{3.4}$$

where δt is the marginal disutility (MDU) of the time the household devotes to market production. The optimization problem facing the household is to allocate time to market production in a way that maximizes its utility. This gives the following first order conditions and the corresponding levels of time allocation to market production:

$$\frac{\partial U}{\partial t} = \begin{cases} \hat{\alpha} - \delta t \leq 0 \quad \Rightarrow t_1^* = \dfrac{\hat{\alpha}}{\delta} & \text{in ordinary times;} \\ -\delta t \leq 0 \quad \Rightarrow t_2^* = 0 & \text{in case of 'bad luck'.} \end{cases} \tag{3.5}$$

The first order conditions and the corresponding levels of time allocation indicate that when the household observes 'bad luck' it should devote 0 hours to market production. In 'ordinary times' it should devote a positive number of hours to market production. Up to this point, the problem is trivial; the household chooses its level of time allocation based on prevailing production conditions with the understanding that the migrant guarantees a minimum level of consumption in case of 'bad luck'. The migrant, on the other hand, simply knows the household's level of production and remits funds if the the current level signals 'bad luck'. However, imperfect information, on the migrant's part, may allow the household to assume opportunistic behavior. Explicitly, the household may reduce time devoted to market production

[4]Samuelson's (1956) consensus model and Becker's (1974, 1981) altruist model provide the theoretical foundation of the unitary approach. For the purpose of this study it is sufficient to suggest that for family demands the implications of the altruist model and the consensus model coincide, thus, I would not attempt to distinguish between the two (see Lundberg and Pollak, 2008).

[5]I assume that the migrant has no utility function. The only role that the migrant plays in the model is to remit funds based on the initial insurance contract that guarantees a minimum level of consumption to the household.

during ordinary times in order to falsely signal 'bad luck'. The migrant, in such a case, would interpret the fall in household's production as originating from an exogenous drop in household's productivity when in reality the production is low since the household is not devoting sufficient time to market production (in other words, the household is consuming more leisure). I will define this situation as the "moral hazard effect of remittances". However, the household would only assume this behavior in ordinary times if it enjoys a higher utility from not working than from working. A comparison between the two utility levels (resulting from $t_1^* = \frac{\hat{\alpha}}{\delta}$ and $t_2^* = 0$) would give us the optimal solution:

$$U(t_1^*) = U(\frac{\hat{\alpha}}{\delta}) = \frac{\hat{\alpha}^2}{2\delta} \tag{3.6}$$

and

$$U(t_2^*) = U(0) = Y^{min} \tag{3.7}$$

In order to have a positive allocation of time to market production, the following condition (which is termed the "no moral hazard condition") must be satisfied:

$$\begin{aligned} U(t_1^*) &> U(0) \\ \frac{\hat{\alpha}^2}{2\delta} &> Y^{min} \end{aligned} \tag{3.8}$$

A closer look at the "no moral hazard condition" indicates that the precise factors that determine whether the household chooses to avoid work or not are the productivity of the household during ordinary times, $\hat{\alpha}$, and the marginal disutility of their time

devoted to market production, δt. The condition 3.8 can be re-written as:[6]

$$\left(\frac{\textit{Productivity in ordinary times}}{\textit{2(MDU of production time)}}\right) \textit{Consumption in ordinary times} > \textit{Consumption in 'bad luck'}$$

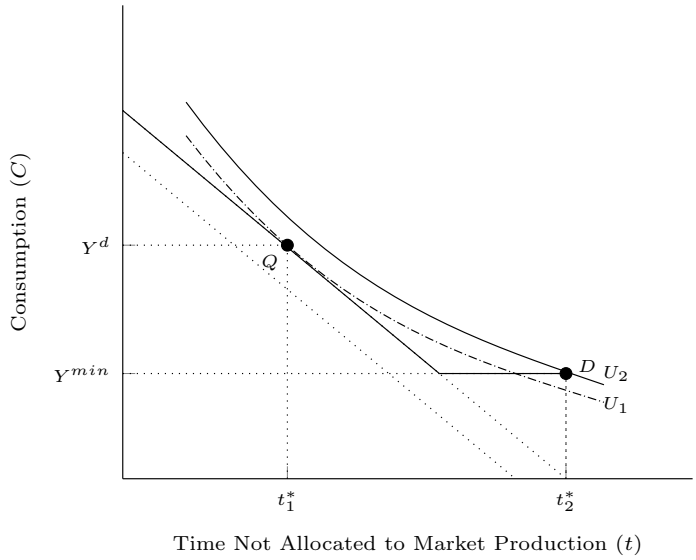
Since consumption in ordinary times is always higher than consumption in 'bad luck', a sufficiently high productivity in ordinary times and sufficiently low disutility of work would uphold the "no moral hazard condition"; the household would spend $\frac{\hat{\alpha}}{\delta}$ hours in market production during ordinary times and it would spend 0 hours in market production when it observes 'bad luck'. Conversely, if productivity is sufficiently low in ordinary times and marginal disutility of work is high enough, the "no moral hazard condition" will fail to hold and the household will assume opportunistic behavior; the household would spend 0 hours in market production during both ordinary times and in 'bad luck'.[7]

Theoretical and empirical evidence, as outlined in chapter 2, suggest that the "no moral hazard condition" is unlikely to hold. Most empirical studies that examine the labor supply of remittance-receiving households find that recipients work less (see, among others, Rodriguez and Tiongson (2001); Chami et. al. (2005); Acosta (2006)). At a theoretical level, it may be argued that the migrant can set minimum consumption at a level that rules out the possibility of opportunistic behavior (for example, $Y^{min} = \frac{\hat{\alpha}^2}{2\delta}$). However, it is unlikely that the migrant would have information regarding all the parameters in (3.8). Moreover, households can blur information through various tricks (see Azam and Gubert, 2004). Also it is possible that the level of minimum consumption is decided by the family collectively before migration, thus, making it difficult for the migrant to change this level (Rapoport and Docquier, 2005).

[6]Since $U(t_1^*) > U(0) \Longrightarrow \frac{\hat{\alpha}^2}{2\delta} > Y^{min} \Longrightarrow \left(\frac{\hat{\alpha}}{2\delta t}\right)\hat{\alpha}t > Y^{min}$.

[7]Note that the moral hazard effect predicted by this model represents a strong simplification of the problem. In the empirical analysis that follows, I will simply be interested in whether, all else equal, individuals residing in remittance-receiving households devote less time to market production in comparison to their counterparts.

Figure 3.1: Labor Supply with Moral Hazard Effect



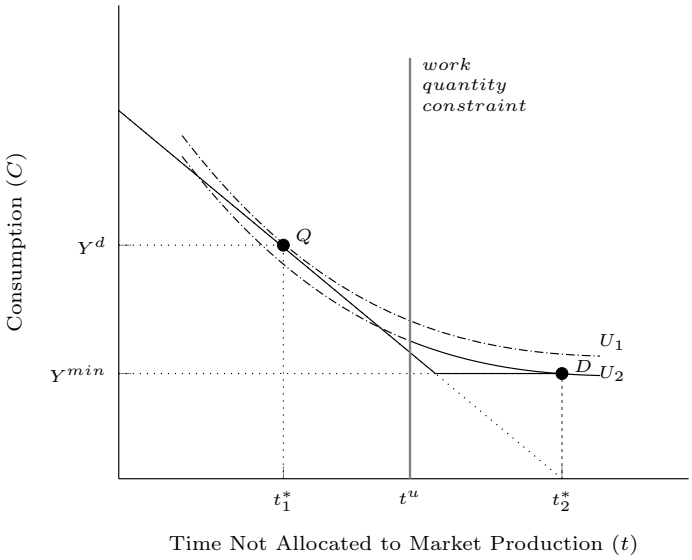
Therefore, in all such cases, the moral hazard equilibrium will emerge.

Figure 3.1 represents the moral hazard scenario. The budget constraint without the insurance arrangement is represented by the dotted line. The budget constraint shifts upwards with the insurance arrangement and is represented by the solid line. The insurance contract allows the household to maintain a minimum level of consumption, Y^{min}. The equilibrium point is at D where the household's expected utility U_2 meets the budget constraint. At this point, the minutes allocated to market production are 0 while expected consumption is Y^{min}. The "no moral hazard" equilibrium, denoted by point Q, fails to occur since $U_2 > U_1$.

3.2 Labor Supply with Work Quantity Constraints

The comparison between $U(t_1^*)$ and $U(0)$, in the aforementioned model, gave us the "no moral hazard condition". Specifically, (3.6) represents the case where the household employs t_1^* hours in market production and generates the expected utility $U(t_1^*)$, and (3.7) represents the case where the household is fully dependent on remittances ($t_2^* = 0$) and enjoys the expected utility $U(0)$. Previously it was argued that

Figure 3.2: Labor Supply with Work Quantity Constraints



the "no moral hazard condition" may fail to hold, $U(0) > U(t_1^*)$, that is the household enjoys higher utility by avoiding work than by supplying hours to the labor market. However, a fair question would be whether the actual number of hours obtainable in the labor market are, indeed, the desired number of hours the household wants to work? If the labor market conditions pose significant constraints on the hours of work available to the household, then, the so-called moral-hazard effect of remittances would be demand-side driven rather than a labor supply problem. In such a case the households would still work fewer hours but it would be unfair to term it as "work-shirking".

Formally, in the presence of an upper bound, let t^u be the hours of work available in the labor market such that $t^u < t_1^*$. Assume, that the "no moral hazard condition" (3.8) holds in this situation, that is $U(0) < U(t_1^*)$ which implies that, in contrast to the moral-hazard equilibrium, the household maximizes utility by working rather than by avoiding work. Figure 3.2 represents this case. In the presence of quantity constraints on available hours of market production (denoted by the gray line in figure 3.2) a household can only obtain a maximum of t^u hours of work. Household's

preferences are represented by the utility curves U_1 and U_2. Note that the situation is reversed in comparison to Figure 3.1 since $U_1 > U_2$, which implies that the household prefers working t_1^* hours. However, since the household cannot obtain more than t^u hours of work, the utility-maximizing point Q is unattainable. The equilibrium point, is again at D—remittance-receiving households still supply 0 hours of work and maintain a minimum level of consumption, Y^{min}.

In migration-remittance literature, the few studies that acknowledge work quantity and quality restrictions suggest that remittances help recipients overcome liquidity constraints and initiate entrepreneurial activities (see Woodruff and Zenteno, 2001). However, evidence for the case of rural Pakistan suggests remittance income to be, usually, only sufficient to maintain households' basic level of consumption and, thus, rarely used for productive investments (Lefebvre, 1999; Watkins 2003). Also, Ballard (2005) suggests that the productive use of remittance funds is contingent on an environment that is conducive to entrepreneurialism. While comparing use of remittances in two rural communities from India and Pakistan, he finds that under-performance in Pakistan is not an outcome of differing entrepreneurial abilities of the two communities. Rather under-performance is a consequence of "differing environmental, infrastructural, and politico-economic characteristics of the two districts", thus, suggesting the presence of demand-side constraints in the Pakistani district.

The probability of facing quantity constraints in hours of labor supply is usually higher for populations dependent on welfare (Osberg, 1993; Holzer and Stoll, 2000). Since the household diversifies labor resources by sending-off its 'best' member (the individual most likely to succeed), thus, the remaining members are relatively more likely to experience work quantity constraints. Normally the family finances emigration of the male household head or the eldest son who, then, remits funds to feed other household members such as women, children and the elderly (Lefebvre, 1999).

In the aforementioned model, if remittances are perceived as a form of social assistance, non-migrating members of the family are likely to experience higher work quantity constraints. In presence of demand-side labor market constraints, one would still observe remittance-receiving households investing less time in market production. However, policy implications would differ drastically.

Chapter 4

Data

4.1 Setting

Pakistan is a predominantly agricultural based economy from which 44% of its 180 million people derive their livelihood. The country experienced high economic growth in the period 2002/03–2006/07, with GDP growth rate rising from 3.1 percent in 2001/02 to 7 percent in 2006/07 (Husain, 2009).[1] A favorable external environment coupled with good economic management enabled the government to increase development spending. The government spent over $16.7 billion on poverty alleviation programs, reducing poverty from 35 percent in 2001/02 to 24 percent in 2006/07. Poverty reduction, however, remained a concern in rural areas with development relatively slow. Unemployment rate fell from 8.3 percent in 2001/02 to 6.5 percent in 2006/07 and 11.8 million new jobs were created (Husain, 2009). In late 2006 the government initiated a nationwide employment scheme with an aim to reduce unemployment (for ages 18–40 years) in mainly remote areas of the country. Economic growth slowed starting fiscal year 2007/08; political instability and unanticipated increases in food, oil and commodity prices were mainly responsible.

[1]The Pakistan Government's fiscal year starts on 1 July of the previous calendar year and concludes on 30 June.

The most recent census records (1998 Pakistan Population and Housing Census) identify 8% of Pakistan's population as domestic or international migrants, which amounts to approximately 14.4 million individuals.[2] Migration in Pakistan, internal or external, is characterized by maintenance of family bonds and kinship ties (Lefebvre, 1999; Ballard, 2001; Watkins, 2003); migrants, thus, maintain a tangible connection with their communities through income remittances. Internal remittances are often small but widespread; aggregate figures for internal remittances are not available. International remittances, on the other hand, are typically larger but concentrated and form the second largest source of foreign exchange for the country after exports. International remittances rose from approximately $3.5 billion in 2002/03 to $6 billion in 2007/08 (Husain, 2009). The economic downturn surfacing in third-quarter of 2007 did not decrease the flow of international remittances. In fact an increase of 21.8% was recorded in 2008 and by 2011 Pakistan ranked 10th in the world with remittance receipts crossing $10 billion ("Remittances cross $10b," 2011).

4.2 The Dataset

This study uses the first nationwide Time-Use survey (the PTUS) conducted from January to December 2007 by the Federal Statistics Bureau of Pakistan. The survey provides data for 19,600 households (11776 rural and 7824 urban) with 37,870 individuals (22,913 rural and 14,957 urban). A three-stage stratified sample design was used to carry out the survey. In the first stage, with the sample size fixed at the provincial level, rural villages and urban enumeration blocks[3] were selected with 'probability proportional to size'[4] method of sampling scheme. In each second stage 16 rural and 12 urban households were selected randomly; households were distributed

[2]Based on recent figures, international migrants amount to 4.7 million individuals (World Bank, 2010). Exact figures for internal migrants are not available.

[3]Federal Statistics Bureau of Pakistan has developed its own sampling frame for all urban areas. Each city/town is divided into enumeration blocks that consist of 200-250 households.

[4]In rural areas population of each village and in urban areas the number of households in each enumeration block is considered as measure of size (PTUS 2007).

evenly over the four quarters to capture seasonal variation. In the third stage, using a selection grid[5], two individuals of age 10 years or older were selected for interviews. Local female enumerators, belonging to the same ethno-linguistic background as the respondents, conducted the interviews. Multiple visits were arranged in order to maintain an exhaustive contact with the respondents. An open-ended question was asked regarding respondents' activities in each thirty-minute interval for a continuous 24-hour period; reported activities were classified using an elaborate coding scheme. Respondents could identify up to three activities, carried out simultaneously or serially, in each 30-minute time-slot, thus providing a rich set of information for each individual's daily usage of time.

The designers of the PTUS were clearly aware of the potential of time-use surveys in providing data for employment, skills training and locational planning. In addition to an elaborate activity classification, detailed information was also gathered regarding respondent's household and individual level characteristics. This information allows addressing endogeneity issues which can be severe in the analysis of migration-remittance impact on migrant-sending economies (see Chapter 5).

The analysis in this paper uses a binary representation of remittance receipts, which are identified, at both individual and household level, in the dataset. Since use of remittance income is usually decided at the household-level (where family members may or may not get an explicit share), thus, I will use remittance information contained in the household module of the survey. For the purpose of this study, the 16,199 individuals aged 18-65 years, and residing in rural households, form the unit of analysis. The subsample consists of 8,777 females and 7,422 males, 11% of which reside in remittance-receiving households.

[5]For details, see PTUS (2007).

4.3 Descriptive Statistics

How does residing in a remittance-receiving household correlate with an individual's daily set of activities in rural Pakistan? Table 4.1 shows the daily time distribution across activities for both men and women who are (and are not) residing in households that receive remittances.[6] The PTUS classifies daily activities into 10 broad activity groups. In order to examine the time allocation towards productive work, we can combine the time spent on primary (farming, fishing, animal husbandry etc.), secondary (construction, manufacturing) and trade (food processing, hairdressing etc.) production activities and define it as *market production*.[7] Similarly, we can add together the time spent on household maintenance, care giving and community work and call it *home production*.[8]

The participation of men and women in market production and home production forms a contrasting pattern as evident in Table 4.1. Although gender-specialization in tasks for rural men and women is anything but surprising yet it is noteworthy that women on average spend 1.4 hours per day on primary production (compared to 3.5 hours for men) in addition to performing almost all the housework. The classification of highly gendered tasks, for example collecting water (activity 250), as primary production, by the United Nations System of National Accounts (SNA), partly explains this anomaly (Motiram and Osberg, 2010).

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[6]For individuals below the age of twenty-five, the age group is chosen in order to investigate the impact of remittances on investment in higher education; the age group $18 - 24$ corresponds to post-secondary schooling in Pakistan.

[7]The Pakistan Time-Use Survey follows the United Nation System of National Accounts (UNSNA 1993) in categorizing activities. UNSNA divides activities into three broad groups: economic (SNA), para-economic (Extended SNA) and socio-cultural (Non-SNA). I define SNA activities as *market production*. Since SNA activities include work such as collecting water (activity code 250) and collecting fuel, firewood or dung (activity 236), it is not technically precise to phrase SNA activities as *market production*; an accurate term would be "*market production and self-employment*". However, for brevity and convenience, I will persist with the term *market production*.
Codes in the PTUS for *market production*: *Primary*: activity group 2, *Secondary*: activity group 1, *Trade*: activity group 3.

[8]Codes in the PTUS: *Household Maintenance*: activity group 4, *Care Giving*: activity group 5, *Community Work*: activity group 6.

Table 4.1: Average Daily Time Allocation for Men and Women in Rural Pakistan

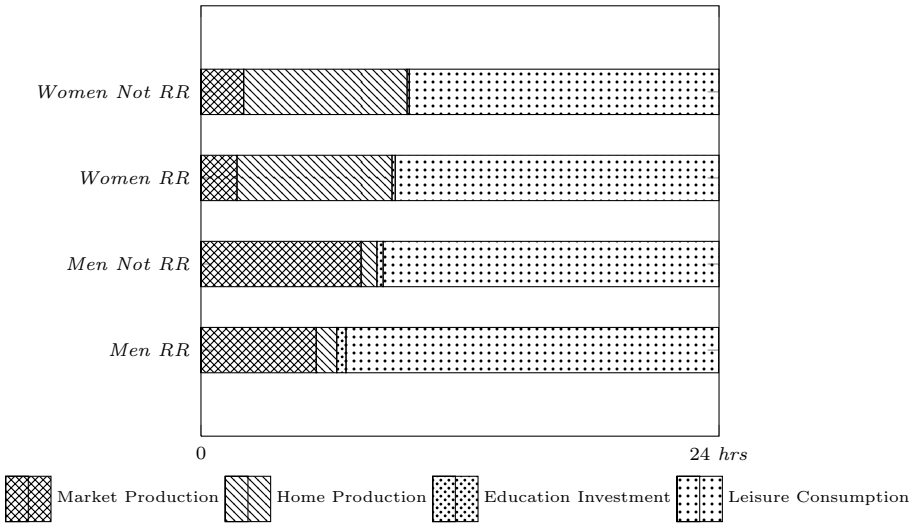
	1	2	3	4	5	6	7	8	9	10
	Primary	*Second*	*Trade*	*Home*	*Care*	*Comm*	*Learn*	*Soc/Cul*	*Media*	*Person*
Women 18 - 24										
Not Receiving Remittance	64.7	10.6	37.3	378.7	110.6	0.8	16.5	156.7	42.1	912.8
Receiving Remittance	64.4	6.4	23.3	334.4	121.4	1.7	23.7	178.2	56.6	947.1
Difference	*0.2*	*4.2*	*13.9*	*44.3*	*-10.8*	*-0.9*	*-7.2*	*-21.5*	*-14.6*	*-34.3*
Men 18 - 24										
Not Receiving Remittance	179.7	118.3	112.4	25.1	8.6	1.5	49.2	273.2	45.2	867.9
Receiving Remittance	126.8	99.6	73.0	34.1	9.4	6.8	77.5	390.0	57.9	866.9
Difference	*53.0*	*18.7*	*39.4*	*-9.1*	*-0.8*	*-5.2*	*-28.3*	*-116.8*	*-12.7*	*1.0*
Women 25 - 44										
Not Receiving Remittance	87.7	8.9	26.5	429.9	139.5	1.3	0.8	151.8	27.0	884.6
Receiving Remittance	75.5	5.2	10.8	398.8	154.5	1.2	0.8	169.6	38.3	914.8
Difference	*12.2*	*3.7*	*15.6*	*31.1*	*-15.0*	*0.1*	*0.0*	*-17.8*	*-11.2*	*-30.2*
Men 25 - 44										
Not Receiving Remittance	217.9	144.3	129.2	26.9	25.4	2.8	1.0	247.0	34.4	879.7
Receiving Remittance	156.4	83.4	116.8	39.1	25.0	7.0	0.8	352.5	51.5	917.9
Difference	*61.6*	*60.8*	*12.4*	*-12.2*	*0.4*	*-4.2*	*0.2*	*-105.4*	*-17.0*	*-38.2*
Women 45 - 65										
Not Receiving Remittance	93.8	8.2	19.8	250.9	47.6	2.4	0.1	219.4	24.7	1038.8
Receiving Remittance	101.5	4.8	8.9	224.1	56.6	1.3	0.7	248.0	28.6	1066.2
Difference	*-7.8*	*3.4*	*10.9*	*26.8*	*-9.0*	*1.2*	*-0.6*	*-28.6*	*-4.0*	*-27.4*
Men 45 - 65										
Not Receiving Remittance	252.3	95.5	86.2	26.3	13.1	2.2	0.0	285.7	31.0	941.1
Receiving Remittance	209.4	45.2	51.5	37.5	10.4	2.1	0.0	416.5	33.8	988.9
Difference	*42.9*	*50.4*	*34.7*	*-11.2*	*2.7*	*0.1*	*0.0*	*-130.7*	*-2.8*	*-47.8*

Notes: All times in minutes/normal day.
1: Primary Production Activities (Farm, Fish, Collect, Dig); 2: Secondary Activities (Construction, Manufacturing); 3: Trade, Business, and Services; 4: Household Maintenance, Management, and Shopping for Own Household; 5: Care for Children, the Sick, Elderly, and Disabled for Own Household; 6: Community Services and Help to Other Households; 7: Learning; 8: Social and Cultural Activities; 9: Mass Media Use; 10: Personal Care and Self-Maintenance.
Source: Calculations by author from PTUS 2007.

A similar pattern of time allocation continues for men and women residing in remittance-receiving households but gender disparities in work burden magnify. Figure 4.1 shows that, although, women residing in remittance receiving households reduce the time spent in market production and home production, yet a much larger cutback in market production by men, in fact, widens the gender gap. Women residing in remittance-receiving households spend an additional 154 minutes per day on market and home production (compared to 84 minutes per day for women who do not receive remittances) in relation to their male counterparts. Empirical studies that have investigated the impact of remittances on female labor supply, attribute reduced labor force participation to increased home production (see Hanson (2007), Gorlich et. al (2010)). For the case of rural Pakistan, Table 4.1 shows that such women decrease household maintenance time and increase care-giving time to relatively maintain time spent on overall home production. From a co-insurance and 'moral hazard' perspective, this might imply that men residing in remittance-receiving households are more likely to avoid work in comparison to women.

Men who receive remittances have less market production by almost 2 hours per day across all age groups; one may wonder where does all this additional time go? Gorlich et. al. (2010) suggest that investment in higher education and assistance in home production may account for a reduced labor supply for men. However, Table 4.1 indicates that men, who reside in remittance-receiving households of rural Pakistan, spend, on average, an additional 118 minutes per day on social and cultural activities (coded as activity group 8 in the PTUS). I will combine the time spent on social and cultural activities (activity group 8), mass media use (activity group 9) and personal care and maintenance (activity group 10), and define it as *leisure consumption*. Figure 4.1 indicates that men residing in remittance-receiving households consume most leisure while women who do not receive remittances are the worst-off in this matter. For remittance-receiving men (aged 18 – 24) an increase of about 28 minutes per

Figure 4.1: Time Allocation For Remittance Receiving (RR) and Non-Remittance Receiving ($Not\ RR$) Men And Women



day in learning time can also be observed in Table 4.1. The gender difference in learning time for ordinary men and women (aged 18 – 24) is about 32 minutes (49.2 minutes for men and 16.5 minutes for women), thus, making the time disparity in learning between remittance-receiving and non-remittance receiving men as large as the gender difference for this activity. Studies have suggested two channels through which migration and remittances may impact educational investments among recipient households (Mountford, 1997; Stark et al., 1997; Stark and Wang, 2002). Firstly, alleviation of credit constraints may allow households to obtain more education for their members. Secondly, the 'brain-gain hypothesis' suggests that prospects of future migration may motivate non-migrating family members to invest in education since destination communities provide higher payoffs than those at origin (Gorlich et al., 2010).[9] However, migrant workers from rural Pakistan are generally employed in unskilled blue-collar jobs. Thus, for rural Pakistan, higher education (ages 18 – 24) may not be as important as it is in some other cases.

[9]Loss of skilled-workers (*brain drain*) through emigration can be offset by additional investments in education induced by prospects of migration. In such a case, the country will have a net benefit or *brain-gain* (Gorlich et. al., 2010).

Time-use patterns corroborate theoretical predictions and previous empirical findings. Impact of remittances, though, is not felt analogously across genders. In the next section, I will account for endogeniety of remittance inflows since remittance-receiving families are not usually randomly selected from the population. Unequivocal conclusions can only be drawn if we can attribute differences in time-use behavior solely on the receipt of remittances.

Chapter 5

Empirical Strategy

5.1 Propensity Score Matching

The key research question that I aim to investigate is whether receiving remittances causes family members to supply less hours to the labor market. An isolated examination of labor force participation only paints a partial picture; I will, thus, examine (in addition to market production) whether remittances cause recipients to alter time-use behavior in regards to home production, education investment and leisure consumption.

The ideal case to examine causality in this situation would involve a natural experiment. Theoretically, randomly chosen households would send family members to work outside the village. Since the households are selected at random, they must, on average, be identical to households that are restricted to emigrate. I would then compare the daily time-use pattern of individuals who reside in migrant-sending (treated) households with those in non-migrant-sending (control) households. Any differences observed in behavior between the treated and the control groups can then be attributed to remittances. Following the notation of evaluation literature, let $D = 1$ if a household receives remittances and $D = 0$, otherwise. The outcome (market production, home production, leisure consumption or education investment) can then be

defined as $Y(1)$ for individuals residing in migrant-sending households and $Y(0)$ for their counterparts. The average effect of receiving remittances in the population is given by:

$$E[Y(1) - Y(0)] \tag{5.1}$$

However, in practice, we cannot (and should not wish to) restrict household members from emigrating when it may benefit them. Thus, there may exist specific household characteristics that effect both emigration and labor supply behavior of the remaining family members. For instance, migration is a costly endeavor and so, in a non-experimental setting, this would imply that households with greater wealth might be the only ones that may afford to send members outside the village and, consequently, receive remittances. This initial endowment of migrant-sending households may also allow their family members more leisure time, greater support in domestic work and better education. Also, it is possible that poor health of a parent may prompt emigration of a child and also force the parent to remain inactive in the local labor market. Hence, the impact of such characteristics, rather than those of remittances, may confound a naive comparison between the treated and the non-treated groups. This can be seen by extending (5.1):

$$\begin{aligned} E[Y(1) - Y(0)] &= E[Y(1)|D = 1] - E[Y(0)|D = 0] \\ &= E[Y(1) - Y(0)|D = 1] + E[Y(0)|D = 1] - E[Y(0)|D = 0] \end{aligned} \tag{5.2}$$

The first term in (5.2) represents the average treatment effect on the treated ($ATET$)—the parameter of interest I want to isolate. The second and third terms represent the *selection bias*—the existing distinctions between the two groups before treatment. Thus, the parameter of interest will be unbiased if there are no systematic differences between the two groups, that is, the selection bias equals zero.

In order to avoid this problem I employ a propensity score based matching technique

(propensity score matching or PSM, Rosenbaum and Rubin. 1983, 1985). An implicit assumption that underlies this method is that treatment (i.e. receiving remittances), although not random, can be explained by observable household characteristics. For each treated household, PSM selects a non-treated household with similar characteristics and includes it in the control group. Matching is carried out based on a single index function, the propensity score $P(X)$, which represents the probability of receiving remittances conditional on a set of covariates X (where X is a vector of the observable household characteristics). However, resolving the selection bias depends upon satisfying two fundamental assumptions. The first key assumption—called conditional independence assumption (CIA) (Lechner, 2000)—requires the true treatment assignment to be independent from the outcome, if the relevant set of covariates X are held constant. Formally, the assumption is satisfied if:

$$Y(0), Y(1) \perp D|X \tag{5.3}$$

where the outcomes $Y(0)$ and $Y(1)$ are orthogonal to the treatment, given that none of the variables in the vector X are influenced by the treatment D. A practical implication of (5.3) is that remittances would change post-migration household income. Thus, I will approximate income by household assets that are less likely to be affected by the present flow of remittances (McKenzie and Sasin, 2007). The second fundamental assumption (overlap condition) prevents perfect predictability of treatment D given the set of covariates X:

$$0 < P(D = 1) < 1 \tag{5.4}$$

The overlap condition ensures that households with similar characteristics have a positive probability of both receiving and not receiving remittances.

In order to create a matched sample of households—such that they share nearly similar probabilities of receiving remittances—I will use two forms of greedy matching: nearest neighbor matching and caliper matching. Matching techniques are implemented using MatchIt (Ho, Imai, King, and Stuart, 2011); MatchIt works in union with the R programming language and statistical software R Development Core Team (2011).

5.2 Post-Matching Analysis

The probability of receiving treatment (remittances) and post-matching comparison of the treated and control groups

To examine the probability of receiving remittances, I estimate a probit model based on household characteristics. The typical household characteristics that determine the inflow of remittances include household composition, wealth and location (McKenzie and Sasin, 2007). The results from the probit estimation are displayed in Table A.1. The first factor, household composition, is captured by seven variables. Female-headed households are ten times more likely to receive remittances. The strong effect may indicate migration of a male family member (Borraz and Pozo, 2010). However, it may also reflect the dependence of female family members (such as mothers and wives) on migrant's income (Gubert et. al., 2010); the variable 'number of female members in the household' has a similar effect. The number of young children (0-5 years) and elderly (65 years and above) in the household increase the likelihood of receiving remittances, reflecting their dependence on remittance income. The family size and the number of middle-aged children (6–15 years) seem to capture the potential work force size of the family; remittance recipiency is negatively related to these variables. The second factor, household wealth, may be directly affected by migration, thus, I will approximate it through certain household characteristics that are less likely to be affected by the present flow of remittances. Household wealth is

found to positively predict remittance recipiency as indicated in the positive coefficients for the variables dwelling's ownership status, dwelling type, asset index, and electricity and water connection. The third factor, household location, is identified at the provincial level, where Punjab (PUNJ) and Khyber Pakhtunkhwa (KPK) are the two predominantly remittance-receiving regions.[1] Household's located in Punjab and KPK are 13% and 18.6% more likely to receive remittances, respectively.

Since, I am interested in the effects of remittances on *individuals'* time-use pattern, in what follows, I use PSM to match *individuals* in recipient households with *individuals* in non recipient households. I pair individuals based on household-level (Table A.1) and individual-level (age, schooling, marital status, employment status) characteristics. I limit my sample to the age group 18-65 years and, further, differentiate by gender. This leaves me with a sample of 16,199 individual ($8,777$ women and $7,422$ men), 11% percent of which reside in remittance-receiving households.

In Table A.2, I summarize key variables for treated, non-treated and matched individuals. The matched samples are significantly smaller than the overall sample; since caliper matching further restricts the distance between treated and control observations, thus, the sample size for caliper matching is smaller than nearest neighbor matching. Note that individuals residing in treated (remittance-receiving) households are generally older and more educated than those residing in pre-matched non-treated households; they are also less likely to be married and, for the case of men, more likely to hold a job.

The idea behind PSM was to create a control group in which non-treated individuals resemble the treated individuals in every dimension except, of course, their receipt of remittances. Nearest neighbor and caliper matching, as shown in Table A.2, give

[1]Ideally the PTUS would have provided district level statistics. Since my analysis does not distinguish between internal remittances, often small but widespread among the rural population, and international remittances, typically larger but more concentrated, thus, district level statistics would be limited in their usefulness (Adams, 1992).

us individuals who are identical to the remittance recipients over the covariates used in PSM.[2] At instance, the average number of schooling years among the non-treated and treated women is 1.38 and 2.02 years, respectively. Remittances appear to be selecting on female educational attainment i.e. females with higher education are more likely to receive remittances. Since educational attainment is likely to influence time employed in market production, thus, a simple comparison between the treated and the non-treated groups would confound the impact of remittances with that of educational attainment on market production. The matched samples, on the other hand, are almost identical to the treated group in terms of average number of schooling years; women in the 'matched-nearest' and 'matched-caliper' samples have 2.04 and 2.02 years of schooling, respectively.

It is noteworthy that PSM also significantly improves the comparability of treated and non-treated groups across "unobservables"—household and individual characteristics that were not included while calculating the propensity scores. For example, the difference in the average personal incomes of treated (Rs. 2,980 for men and Rs. 1,100 for women) and pre-matched non-treated (Rs. 3,950 for men and Rs. 360 for women) groups is statistically significant; however, the matched men and women are indistinguishable from their treated counterparts in this respect.

Next, I will attempt to answer the central question posed in this paper: how do remittance receipts impact labor market behavior of recipients? Answering in a unified context will require an examination of recipients' round-the-clock activities. Therefore, I will estimate the impact of remittances on market production and its complements, namely, leisure consumption, home production and education investment. Results are discussed in the next section.

[2]Note that in presence of an omitted variable that plausibly affects both migration-remittance decision and time-use behavior (e.g. disability of a family member or lack of jobs locally), the impact of remittances on time-use behavior of recipients will be either over or under estimated.

Chapter 6

Results

Estimation results are obtained using three datasets: unmatched (dataset before implementing PSM), matched-Nearest Neighbor (dataset after implementing Nearest Neighbor Matching) and matched-Caliper (dataset after implementing Caliper Matching). Tables in Appendix B display full results. Column 1 in each table displays results obtained from the unmatched dataset; column 2 and column 3 display results obtained from matched-Nearest and matched-Caliper datasets, respectively. Since Caliper matching restricts the distance between the treated and the control observations to a certain radius so it provides a sample that is closest to one available in a natural experiment. However, in restricting the distance between matched observations, Caliper matching drops treated observations for which it is unable to find 'close enough' matches. Thus Caliper matching generates matched datasets that are smaller than those generated by Nearest Neighbor matching. A trade-off between *efficiency* (depends on the sample size) and *biasness* (depends on the quality of matches), therefore, exists when choosing between Nearest Neighbor and Caliper matching. Which algorithm provides the best results? Caliendo and Kopeinig (2005) advise that "(when choosing a matching estimator) it should be clear that there is no winner" and so "pragmatically, it seems sensible to try a number of approaches; should they give similar results, the choice may be unimportant." Thus I will mainly

focus on whether estimation results in columns 2 and 3 corroborate each other or not. In case results differ, I will explain the disparity and indicate the most plausible results.

6.1 Basic Results

Market Production

Table 6.1 displays the estimation of market production time for men and women (aged 25 - 65); full results can be seen in Appendix B (Tables B.1 and B.3).[1] Turning first to the case of men, results indicate that men who reside in remittance-receiving households have less time devoted to market production. Column 1 in Table B.1 indicates that age and education increase time employed in market production but at a decreasing rate (given the negative coefficient on age and education squared).[2] Moreover, being married and having children below seven does not seem to significantly impact time spent in market production. Men residing in female-headed households invest an additional 70 minutes per day in market production; this may indicate the absence of a male family head and, consequently, greater work burden on other male members of the household.[3] Men residing in KPK spend approximately 34 minutes fewer per day on market production while those residing in Punjab spend an additional 46 minutes per day in similar activities.

Table B.3 presents results of a comparable model for the case women. Differences in

[1]Note that estimations in Tables B.1 and B.3 do not include personal and household income as explanatory variables. Since market production time (t) includes time spent working, thus, estimations that include personal and household income (wt^*) would suffer from endogeneity. However, market production time also includes commuting and labor search time ($t - t^*$) and so the variables personal and household income are not completely endogenous. Therefore, in Tables B.2 and B.4, I provide estimations including personal and household income variables; results are almost identical. I will focus on Tables B.1 and B.3.

[2]Note that when discussing explanatory variables other than remittances, I only use results from column 1. This is because columns 2 and 3 use datasets that have been generated after matching observations over most of the explanatory variables used in the outcome analysis.

[3]Incidence of female-headed households with male individuals (between age 25-65) is very low in rural Pakistan (approximately 1.9%). However for remittance-receiving households this percentage jumps to 15.35% which is relatively high.

Table 6.1: OLS Estimation of Market Production Time

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances (Men)	−1.309***	−1.890***	−1.249**
	(0.402)	(0.559)	(0.575)
Remittances (Women)	−0.448***	−0.350*	−0.311
	(0.166)	(0.186)	(0.197)

Note. Dependent variable is market production. Market production equals total time invested in primary, secondary and trade production activities. In the regression results, 1 unit indicates 30 minutes.
* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

coefficient signs for several variables are to be expected. Women residing in remittance receiving households devote 13 minutes fewer to market production per day; the difference is trivial. Interestingly, education is negatively related to market production; women in rural Pakistan mostly work in the primary sector (activities such as crop farming, tending animals, collecting water etc.), education, thus, may indicate an increase in personal wealth and a consequent decrease of participation in primary production activities. Oldest female members in South Asian families hold a unique position of respect and authority in the household; a women in this role enjoys lesser time in market production, which is indicated by the negative coefficient on this variable.

The results in Tables B.1 and B.3 are in accord with what we may expect for such standard conditioning variables. Men and women residing in remittance-receiving households cutback on time spent in market production. However, as explained in section 5.1, results obtained from the unmatched dataset cannot be trusted since remittances are unlikely to be exogenous from other household characteristics. For the case of men, Table 6.1 shows that remittance receipts lead to a reduction in time devoted to market production even when individuals are matched across relevant observable characteristics. Men who reside in remittance-receiving households

reduce work effort by 57 and 38 minutes when estimations are obtained from Nearest-Neighbor and Caliper matched datasets, respectively. Estimates for the case of women are ambiguous. Column 2 of Table 6.1 reveals that women spend 10 minutes fewer on market production and the coefficient is significant. Coefficient on market production in column 3, however, is not significant. The magnitude of coefficients is small enough to suggest that the difference is economically trivial. Thus, for the case of women, I will conclude that there is no significant difference in time spent on market production that can be attributed to remittance receipts.

Home Production

Table 6.2 displays the estimation of home production time for men and women (aged 25 - 65); complete results can be seen in Appendix B (Tables B.5 and B.6). Home production includes three broad activity groups: household maintenance, care giving and community work. Household maintenance and care giving are highly gendered activities in rural Pakistan; men spend few minutes per day in these activities. Being married and having children below seven and joblessness are the only individual level characteristics that impact time employed in home production for men. Male members of households in KPK, however, devote an additional 21 minutes per day in such activities.

Women, on the other hand, bear the burden of almost all the housework and caregiving activities. The results obtained using the unmatched dataset indicates that women residing in remittance-receiving households provide an additional 17 minutes per day on home production activities. Table B.6 indicates that being married and having children below seven are highly significant indicators of increased home production; married women spend 60 minutes more per day on home production while an additional child below seven means 38 minutes more per day in similar activities.

Table 6.2: OLS Estimation of Home Production Time

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances (Men)	−0.062	0.222	−0.001
	(0.194)	(0.310)	(0.359)
Remittances (Women)	0.566*	0.719**	1.001***
	(0.295)	(0.335)	(0.353)

Note. Dependent variable is home production. Home production equals total time employed in household maintenance, care giving and community work. In the regression results, 1 unit indicates 30 minutes.
* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Interestingly, residing in a female-headed household implies a reduction in time devoted to home production by a magnitude of 52 minutes per day. This may be due to greater intra-household work burden sharing of domestic activities; the positive coefficient (of a similar magnitude) on the dummy for household head supports this logic. Greater personal and household income is negatively related to time spent in home production activities, however the magnitude is negligible. Women residing in households with a piped-water connection spend more time in domestic work, suggesting less time required in primary activities such as collecting water. Women residing in KPK devote 42 minutes fewer per day on home production activities.

Columns 2 and 3 of Table 6.2 indicate the impact of remittance receipts on home production when endogeniety issues are addressed using the Nearest-Neighbor and Caliper matching techniques. Findings are consistent with the estimation results obtained using the unmatched dataset. There is still no evidence that men who reside in remittance receiving households differ in home production behavior when compared to other men. However, for the case of women, estimations using Nearest-Neighbor and Caliper matched datasets indicate that remittance receipts result in an additional 22 and 30 minutes of home production per day (compared to 17 minutes for the unmatched dataset), respectively.

Leisure Consumption

Table 6.3 displays the estimation of leisure consumption time for men and women (aged 25 - 65); complete results can be seen in Appendix B (Tables B.7 and B.8). Leisure consumption includes time spent in three broad activity groups: social and cultural activities, mass media use, and personal care and maintenance. Column 1 of Table 6.3 indicates that men residing in remittance-receiving households consume an extra 65 minutes of leisure per day. Full results in Table B.7 suggest that being jobless drastically increases time spent on leisure activities, which is to be expected. Men residing in KPK consume an additional 90 minutes of leisure per day while those in Punjab spend 53 minutes fewer per day on similar activities.

Table B.8 column 1 shows that women residing in remittance-receiving households consume an extra 20 minutes of leisure per day. Being married and having children below seven drastically reduces the time spent on leisure activities while being the oldest female in the household increases leisure consumption by approximately 22 minutes per day. Joblessness increases leisure consumption but the magnitude is significantly smaller compared to the case of men. This is to be expected since home production is a highly gendered activity and so joblessness does not release women from the daily drudgery of domestic work. Residing in a female-headed household allows more leisure time while being the household head takes away such a luxury; this pattern is in sync with the estimation results obtained for home production (Table B.6). Women residing in KPK consume an additional 66 minutes of leisure per day.

Results obtained using the unmatched dataset are to be examined with caution since remittances are unlikely to be exogenous. Using Nearest-Neighbor and Caliper matched datasets, Columns 2 and 3 of Table 6.3 display the impact of remittances on leisure consumption for men and women. Men residing in remittance-receiving households consume more leisure even after individuals are matched over relevant

Table 6.3: OLS Estimation of Leisure Consumption Time

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances (Men)	2.167***	2.545***	1.977***
	(0.502)	(0.720)	(0.742)
Remittances (Women)	0.667**	0.518	0.327
	(0.294)	(0.328)	(0.357)

Note. Dependent variable is leisure consumption. Leisure consumption equals total time spent in social and cultural activities, mass media use, and personal care and maintenance. In the regression results, 1 unit indicates 30 minutes.
* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

covariates. For men estimations results, using the Nearest-Neighbor and Caliper matched datasets, suggest that remittance receipts lead to an additional 76 and 60 minutes of leisure consumption, respectively; the coefficients are highly significant. However, for the case of women the hypothesis can be rejected; columns 2 and 3 of Table 6.3 show that there is no evidence that women residing in remittance-receiving households consume more leisure.

Educational Investment

Tables B.9 and B.10 display the estimation of learning time for men and women (aged 18 – 24). Results indicate that learning time is negatively related to age (for both men and women), which is to be expected. For the case men, personal income negatively impacts learning time; men earning an additional Rs. 1000 per month reduce learning by 32 minutes per day (the coefficient is strongly significant). For women, on the other hand, being married reduces learning time by 22 minutes per day. Moreover, a piped-water connection in the household allows an additional 13 minutes of learning per day for women. Although, the magnitude of this effect is small but this may indicate how time released from primary production activities (specifically collecting water) may be employed elsewhere. This may, however, also reflect greater household

Table 6.4: OLS Estimation of Learning Time

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances (Men)	−0.209	0.321	−0.508
	(0.364)	(0.633)	(0.708)
Remittances (Women)	−0.018	0.115	0.018
	(0.189)	(0.259)	(0.309)

Note. Dependent variable is learning time. Learning time equals total time invested in learning activities (activity group 7). In the regression results, 1 unit indicates 30 minutes.
* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

wealth that allows more investment in the education of female family members. The statistical insignificance of the remittance variable across all three columns of Table 6.4 (for both men and women) indicates that remittances have little impact on time allocated to learning activities. As explained in Chapter 4, theoretical propositions that link greater education with remittance receipts provide two reasons: alleviation of credit constraints and the 'brain-gain hypothesis'. In the case of rural Pakistan, remittance income is usually only sufficient to maintain recipient households' basic level of consumption (Lefebvre, 1999; Watkins 2003). While employment at destination countries generally falls in the category of manual labor. Thus, prospects of future migration do not provide much incentive to acquire further education as well.

6.2 Robustness

Findings, as summarized in section 6.1, suggest that men residing in remittance-receiving households work less and consume more leisure. What leads to this behavior? In sections 3.1 and 3.2, two narratives were developed: labor supply with moral hazard effect and labor supply with work quantity constraints. The significance of work quantity constraints in a third-world rural setting cannot be ignored. However, data limitations do not allow explicit confirmation that remittance-receiving households face greater work quantity constraints. The moral hazard effect of remittances,

on the other hand, will be reinforced if regression equations are estimated for only self-employed individuals (specifically, those who identify themselves as employers, own account workers and owner cultivators in the PTUS). Since self-employed individuals are, theoretically, not subject to limitations in work quantity, any incidence of lower market production and higher leisure consumption would provide evidence for the moral hazard effect of remittances.

Re-estimating equations for market production, home production and leisure consumption for only self-employed men reduces the sample size from 5844 to 2715 observations.[4] With a smaller overall sample size, results may be biased and thus should be examined with caution.

Table 6.5 presents the results for market production, home production and leisure consumption for self-employed male individuals.[5] Column 1 shows the results obtained using the unmatched dataset and columns 2 and 3 display the results obtained using the matched datasets. The direction and magnitude of the estimates is consistent with those in Tables B.1, B.5 and B.7. Using the unmatched, matched-Nearest Neighborand matched-Caliper datasets respectively, the results suggest that men residing in remittance-receiving households decrease market production by approximately 50, 65, and 42 minutes per day and increase leisure consumption by approximately 78, 76, and 78 minutes per day. Coefficients on leisure consumption are strongly significant in all three columns. However, coefficients on market and home production do not agree in columns 2 and 3. Since estimations are based on a relatively small sample size and Caliper matching further reduces the sample size, thus, rejecting the hypothesis based solely on this disparity would be unwise. Moreover, the results obtained with Nearest Neighbor matching agree with estimations in Tables B.1 and B.5, thus, I will

[4]I will ignore the case of women since incidence of self-employment is very low; sample sizes reduces from 6662 to 226 observations only.

[5]Table 6.5 shows partial results; specifically, estimates for remittances are only displayed here. Re-estimations were performed using full equations as outlined in section 6.1.

Table 6.5: OLS Estimation of Market Production, Home Production and Leisure Consumption for Self-Employed Men

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Impact of Remittances on Market Production	−1.641***	−2.162**	−1.385
	(0.634)	(0.979)	(1.011)
Impact of Remittances on Home Production	−0.504*	−0.177	−0.976*
	(0.294)	(0.486)	(0.548)
Impact of Remittances on Leisure Consumption	2.593***	2.537**	2.596**
	(0.752)	(1.062)	(1.115)

Note. In the regression results, 1 unit indicates 30 minutes. Market production equals total time invested in primary, secondary and trade production activities. Home production equals total time employed in household maintenance, care giving and community work. Leisure consumption equals total time spent in social and cultural activities, mass media use, and personal care and maintenance.
* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

choose estimates in column 2 to be more plausible. In this case, the coefficient on home production would be insignificant; this may indicate rigidity of cultural norms that bar men from participating in home production activities.

Results are in line with existing empirical findings that link remittance receipts to a decrease in household's productive efficiency (see, for example, Azam and Gubert, 2004).[6] Since self-employed individuals do not face limitations in work quantity, thus, less time devoted to market production and more time spent in consuming leisure indicates that there exists a moral hazard problem in remittances.

[6]Note that work *quality* constraints may still impact results—for example, an agricultural household that owns poor quality land may finance a member's emigration to insure itself against negative income shocks. However, this still does not fully explain why non-migrating members would reduce time devoted to market production and consume more leisure. In the absence of an insurance contract that is characterized by hidden action, it is likely that households with poor quality land may increase work effort to maintain a minimum level of consumption.

Chapter 7

Concluding Remarks

7.1 Summary and Conclusion

This study implements the statistical technique of Propensity Score Matching on cross-sectional time-use data from Pakistan to assess the impact of remittances on daily time use patterns of individuals residing in remittance-receiving households. Since the departure of a family member changes the intra-household labor force structure, labor market inactivity may not, necessarily, imply inactivity in general. Thus, a unified framework, that divides daily activities in 4 broad groups, allows me to uniquely identify any incidence of labor market inactivity and its complements in terms of greater home production, increased leisure consumption or higher education.

Examining round-the-clock activities of men and women separately, I find that the impact of remittances on daily activity sets are not the same across genders. Men residing in remittance-receiving households devote less time to market production and consume more leisure. Women, on the other hand, invest more time in home production while maintaining the level of market production. Educational investment is not affected by remittance income for both men and women (aged 18 – 24 years).

From the perspective of New Economics of Labor Migration Theory, that considers

migration as an intra-family insurance scheme, findings imply that the 'moral hazard effect' of remittances is only applicable to the case of men. Women, voluntarily or due to societal pressure, uphold the implicit contract that exists between migrant and the household and, in fact, increase home production. However, if labor market inactivity is demand-side driven, findings suggest that men residing in remittance-receiving households fail to generate self-employment; rigidity of gender roles, in turn, permits participation in social and personal activities as the only other 'acceptable' use of time. Since participation of women in market production is limited to activities such as collecting water, work quantity constraints do not affect women.

7.2 Policy Implications

Labor supply with moral hazard effect

The analysis in this study finds that men residing in remittance receiving households work less and consume more leisure. If this effect originates from a decrease in remittance recipients motivation to work, educational and skills development programs that increase the likelihood and benefits of future migration can offer a partial remedy. Since male members of remittance-receiving households have a greater potential for migration (due to established migrant networks) an increase in chances of future migration may encourage a reduction in leisure consumption and an increase in educational investment.

Arif (2009) recommends exploring overseas employment opportunities for poorer areas of the country. He suggests reducing cost of migration by controlling exploitative practices and improving the recruitment system by arranging skills development programs. Educational programs can encourage migration through exploring overseas employment opportunities for potential migrants and by making the migration process relatively less daunting. Skills training programs can build potential migrants' capabilities to move up the value chain. Providing skills training for high-demand

sectors (such as hospitality and healthcare) will not only augment potential migrants' employability in the international labor market but also position Pakistan as a preferred source of skilled and trained human resource.

This policy does not provide a way to increase time devoted in market production. However, it increases time invested in learning and thus it would reduce leisure consumption. Also, this recommendation applies only to relatively younger men (aged 25–40) who have a greater likelihood to emigrate.

Labor supply with work quantity constraints

A lower time allocation to market production and an increase in leisure consumption may result from work quantity constraints. If this is the case then the problem is more deeply rooted in comparison to a moral hazard effect. Demand side data on the behavior of firms in the local labor market is required to make precise policy recommendations.

In the meanwhile, entrepreneurial activities can be encouraged so that remittance recipients can by-pass work quantity constraints. However, in a stagnated economy structural obstacles at regional and national levels may obstruct entrepreneurial initiatives. Ballard (2005) recommends deployment of development funds with objectives to address infrastructural deficiencies. Locality-specific empirical research that identifies innovative forms of income generation would be required to complement the removal of infrastructural blockages. If remittance recipients are provided with an environment conducive to entrepreneurialism and profitable business ideas, they may invest in productive activities as opposed to making consumptive investments (such as weddings and houses). Consequently, time devoted to market production would increase and leisure consumption would fall.

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Appendix A

Propensity Score Matching

Table A.1: Probability That Household Receives Remittances Using Probit Analysis

	β / SE	Marginal Effects
Age (HH head)	0.010***	0.001
	(0.001)	
Female (HH head)	1.363***	0.101
	(0.019)	
Number of Female Members in HH	0.111***	0.008
	(0.005)	
Number of Children 0 - 5 Years Old	0.068***	0.005
	(0.006)	
Number of Children 6 - 15 Years Old	−0.014***	−0.001
	(0.005)	
Number of Elderly in the Household	0.031**	0.002
	(0.012)	
Family Size	−0.037***	−0.003
	(0.004)	
Ownership Status of the Dwelling	0.265***	0.020
	(0.030)	
Dwelling Type - Mud, Mud-Brick, Brick	0.040***	0.003
	(0.009)	
Dummy for Electricity Connection	0.017	0.001
	(0.025)	
Dummy for Piped-Water Connection	0.090***	0.007
	(0.016)	
Asset Index	0.273***	0.020
	(0.013)	
Punjab (PUNJ)	1.751***	0.130
	(0.055)	
Khyber Pakhtunkhwa (KPK)	2.508***	0.186
	(0.055)	
Constant	−4.480***	
	(0.072)	
Observations	83305	
Pseudo R^2	0.354	

Note. For the probit, the dependent variable = 1 if a household receives remittances, 0 if not; number of individuals that reside in remittance-receiving households is 10,934 (13.13%). The sample size for the regression, namely, 83305 indicates the total number of individuals residing in rural households. Asset index is calculated based on durable household assets (see PTUS, 2007).
* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Table A.2: Descriptive Statistics For Treated, Non-Treated And Matched: Women (Top) and Men (Bottom)

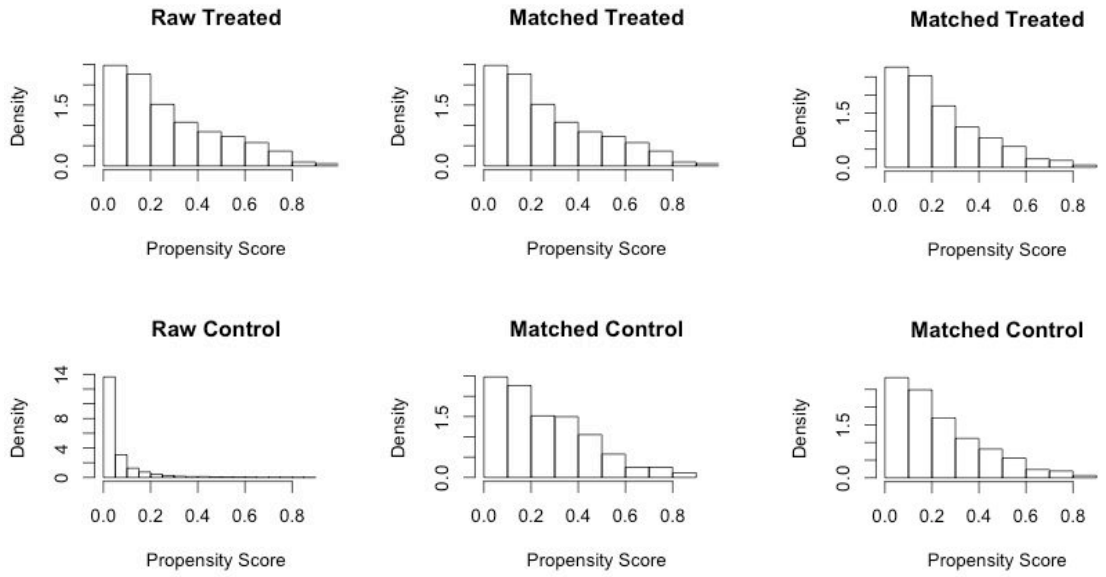
	Treated	Non-Treated	Matched-Nearest	Matched-Caliper
Age (years)	34.23	34.08	34.66	35.44
Education (years)	2.02	1.38	2.04	2.02
Jobless (=1 yes; =0 no)	0.77	0.77	0.76	0.75
Personal Income	1.10	0.36	0.52	0.52
Marital Status (=1 married; =0 otherwise)	0.77	0.83	0.76	0.76
Dwelling Type - Mud, Mud-Brick, Brick	2.23	2.07	2.19	2.21
Number of Children below 7	0.92	1.15	1.07	1.02
Number of Children between 7 and 18	0.88	1.10	0.96	0.98
Observations	1267	7510	1267	1048
Age (years)	36.69	35.96	36.09	36.85
Education (years)	5.28	4.08	5.56	5.25
Jobless (=1 yes; =0 no)	0.26	0.08	0.27	0.25
Personal Income	2.98	3.95	3.28	3.26
Marital Status (=1 married; =0 otherwise)	0.60	0.76	0.59	0.61
Dwelling Type - Mud, Mud-Brick, Brick	2.25	2.08	2.28	2.24
Number of Children below 7	0.48	1.09	0.70	0.74
Number of Children between 7 and 18	0.76	1.03	0.93	0.86
Observations	521	6901	521	466

Note. Personal Income is in RS. '000s. The number of children (below 7 and between 7 and 18) indicates an individual's number of children.
Source: Calculations by author from PTUS 2007.

Figure A.1: Histograms of Propensity Scores for the Unmatched, Treated and Matched Groups

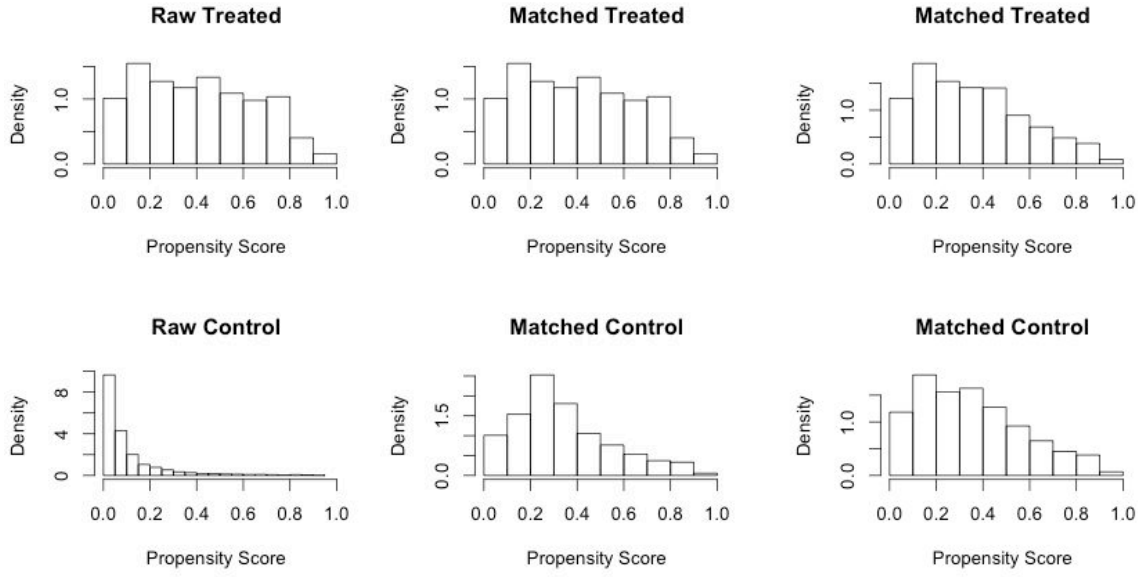
Men Aged 18 - 65

Unmatched	Nearest Matching	Caliper Matching



Women Aged 18 - 65

Unmatched	Nearest Matching	Caliper Matching



Appendix B

Outcome Analysis

Table B.1: OLS Estimation of Market Production Time - Men 25 - 65

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances	−1.309***	−1.890***	−1.249**
	(0.402)	(0.559)	(0.575)
Age (years)	0.132*	0.302	−0.041
	(0.069)	(0.205)	(0.216)
Age squared	−0.002***	−0.004**	−0.000
	(0.001)	(0.002)	(0.002)
Education (years)	0.096*	0.225	0.212
	(0.056)	(0.174)	(0.176)
Education squared	−0.020***	−0.024*	−0.019
	(0.004)	(0.013)	(0.013)
Marital Status (=1 married; =0 otherwise)	0.346	0.439	1.214
	(0.344)	(0.874)	(0.883)
Married and Children below 7	0.030	0.204	−1.183
	(0.323)	(1.109)	(1.145)
Number of Children below 7	0.163	−0.048	0.425
	(0.109)	(0.426)	(0.446)
Jobless (=1 yes; =0 no)	−13.886***	−12.733***	−13.135***
	(0.370)	(0.700)	(0.744)
Dummy for HH Head	0.042	−0.500	−0.451
	(0.317)	(0.992)	(0.960)
Age (HH head)	0.019*	0.066**	0.031
	(0.010)	(0.029)	(0.028)
Female (HH head)	−2.282***	−3.612***	−2.647**
	(0.765)	(1.206)	(1.278)
Number of Elderly in the Household	−0.197	−1.009*	−1.279**
	(0.214)	(0.520)	(0.560)
Number of Children 6 - 15 Years Old	−0.086	−0.122	−0.031
	(0.057)	(0.139)	(0.153)
Ownership Status of the Dwelling	−1.281***	−2.579*	−1.561
	(0.353)	(1.390)	(1.269)
Dummy for Piped-Water Connection	0.049	0.091	0.212
	(0.219)	(0.604)	(0.644)
Khyber Pakhtunkhwa (KPK)	−1.132***	−3.377	−0.609
	(0.277)	(5.179)	(7.175)
Punjab (PUNJ)	1.542***	−0.202	2.048
	(0.200)	(5.188)	(7.169)
Constant	15.037***	13.550**	17.282**
	(1.429)	(6.879)	(8.595)
Observations	5844	706	649
R^2	0.271	0.419	0.392

Note. Dependent variable is market production. Market production equals total time invested in primary, secondary and trade production activities. In the regression results, 1 unit indicates 30 minutes. The number of children below 7 indicates an individual's number of children.

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Table B.2: OLS Estimation of Market Production Time with Personal and Household Income as Explanatory Variables - Men 25 - 65

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances	−1.163***	−1.791***	−1.237**
	(0.410)	(0.584)	(0.606)
Age (years)	0.160**	0.297	−0.009
	(0.070)	(0.208)	(0.218)
Age squared	−0.003***	−0.004*	−0.001
	(0.001)	(0.002)	(0.002)
Education (years)	0.112**	0.235	0.232
	(0.056)	(0.175)	(0.177)
Education squared	−0.018***	−0.023*	−0.017
	(0.004)	(0.013)	(0.013)
Marital Status (=1 married; =0 otherwise)	0.434	0.481	1.323
	(0.344)	(0.878)	(0.893)
Married and Children below 7	0.002	0.156	−1.169
	(0.323)	(1.114)	(1.150)
Number of Children below 7	0.156	−0.050	0.404
	(0.109)	(0.427)	(0.447)
Personal Income	−0.111**	0.009	−0.142
	(0.048)	(0.115)	(0.120)
Jobless (=1 yes; =0 no)	−14.215***	−12.761***	−13.443***
	(0.385)	(0.733)	(0.784)
Dummy for HH Head	−0.006	−0.594	−0.343
	(0.329)	(1.018)	(0.984)
Age (HH head)	0.020**	0.065**	0.033
	(0.010)	(0.029)	(0.028)
Female (HH head)	−2.356***	−3.684***	−2.684**
	(0.764)	(1.213)	(1.280)
Number of Elderly in the Household	−0.200	−1.008*	−1.291**
	(0.214)	(0.520)	(0.561)
Number of Children 6 - 15 Years Old	−0.052	−0.107	0.002
	(0.057)	(0.142)	(0.158)
Household Income	−0.089*	−0.076	−0.030
	(0.047)	(0.124)	(0.131)
Ownership Status of the Dwelling	−1.154***	−2.493*	−1.364
	(0.353)	(1.401)	(1.283)
Dummy for Piped-Water Connection	0.121	0.109	0.224
	(0.219)	(0.605)	(0.645)
Khyber Pakhtunkhwa (KPK)	−1.267***	−3.328	−0.922
	(0.278)	(5.187)	(7.201)
Punjab (PUNJ)	1.413***	−0.145	1.716
	(0.202)	(5.196)	(7.198)
Constant	15.091***	13.983**	17.148**
	(1.450)	(6.939)	(8.597)
Observations	5844	706	649
R^2	0.274	0.419	0.394

Note. Dependent variable is market production. Market production equals total time invested in primary, secondary and trade production activities. In the regression results, 1 unit indicates 30 minutes. The number of children below 7 indicates an individual's number of children.

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Table B.3: OLS Estimation of Market Production - Women 25 - 65

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances	−0.448***	−0.350*	−0.311
	(0.166)	(0.186)	(0.197)
Age (years)	0.086**	0.090	−0.036
	(0.039)	(0.070)	(0.076)
Age squared	−0.001**	−0.001	0.000
	(0.000)	(0.001)	(0.001)
Education (years)	−0.168***	−0.130	−0.146*
	(0.050)	(0.083)	(0.087)
Education squared	0.003	0.001	0.004
	(0.004)	(0.007)	(0.007)
Marital Status (=1 married; =0 otherwise)	0.085	0.065	0.274
	(0.179)	(0.295)	(0.318)
Married and Children below 7	0.031	0.087	0.098
	(0.185)	(0.374)	(0.396)
Number of Children below 7	−0.217***	−0.149	−0.270*
	(0.063)	(0.131)	(0.141)
Jobless (=1 yes; =0 no)	−8.566***	−8.261***	−8.380***
	(0.117)	(0.217)	(0.232)
Dummy for HH Head	0.866***	0.904**	1.038***
	(0.331)	(0.355)	(0.388)
Dummy for Oldest Female in HH	−0.338*	0.190	−0.192
	(0.178)	(0.343)	(0.360)
Age (HH head)	−0.000	−0.003	−0.005
	(0.004)	(0.008)	(0.008)
Female (HH head)	−0.443	−0.414	−0.581
	(0.303)	(0.339)	(0.362)
Number of Elderly in the Household	−0.031	0.071	0.043
	(0.110)	(0.186)	(0.192)
Number of Children 6 - 15 Years Old	0.106***	0.112**	0.120**
	(0.033)	(0.054)	(0.056)
Ownership Status of the Dwelling	−0.334	0.368	0.390
	(0.208)	(0.419)	(0.433)
Dummy for Piped-Water Connection	−0.754***	−0.828***	−0.768***
	(0.119)	(0.202)	(0.220)
Khyber Pakhtunkhwa (KPK)	−0.551***	1.835	1.069
	(0.149)	(1.409)	(1.304)
Punjab (PUNJ)	−0.887***	1.419	0.545
	(0.120)	(1.409)	(1.303)
Constant	10.157***	6.444***	9.908***
	(0.815)	(2.125)	(2.151)
Observations	6662	1871	1580
R^2	0.469	0.465	0.476

Note. Dependent variable is market production. Market production equals total time invested in primary, secondary and trade production activities. In the regression results, 1 unit indicates 30 minutes. The number of children below 7 indicates an individual's number of children.

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Table B.4: OLS Estimation of Market Production Time with Personal and Household Income as Explanatory Variables - Women 25 - 65

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances	−0.323*	−0.222	−0.273
	(0.170)	(0.192)	(0.203)
Age (years)	0.089**	0.095	−0.035
	(0.039)	(0.070)	(0.076)
Age squared	−0.001**	−0.001	0.000
	(0.000)	(0.001)	(0.001)
Education (years)	−0.141***	−0.103	−0.132
	(0.050)	(0.083)	(0.088)
Education squared	0.002	0.001	0.003
	(0.004)	(0.007)	(0.007)
Marital Status (=1 married; =0 otherwise)	0.104	0.163	0.326
	(0.179)	(0.295)	(0.319)
Married and Children below 7	0.007	0.039	0.076
	(0.185)	(0.374)	(0.396)
Number of Children below 7	−0.225***	−0.161	−0.274*
	(0.063)	(0.131)	(0.141)
Personal Income	0.055	0.021	0.071
	(0.038)	(0.049)	(0.056)
Jobless (=1 yes; =0 no)	−8.460***	−8.177***	−8.297***
	(0.121)	(0.219)	(0.236)
Dummy for HH Head	0.707**	0.724**	0.876**
	(0.334)	(0.361)	(0.396)
Dummy for Oldest Female in HH	−0.402**	0.081	−0.273
	(0.178)	(0.343)	(0.362)
Age (HH head)	0.001	−0.004	−0.005
	(0.004)	(0.008)	(0.008)
Female (HH head)	−0.418	−0.416	−0.572
	(0.303)	(0.338)	(0.362)
Number of Elderly in the Household	−0.006	0.110	0.059
	(0.110)	(0.186)	(0.192)
Number of Children 6 - 15 Years Old	0.131***	0.144***	0.136**
	(0.033)	(0.054)	(0.057)
Household Income	−0.104***	−0.127***	−0.070*
	(0.020)	(0.036)	(0.039)
Ownership Status of the Dwelling	−0.240	0.413	0.415
	(0.209)	(0.418)	(0.433)
Dummy for Piped-Water Connection	−0.716***	−0.809***	−0.754***
	(0.119)	(0.202)	(0.220)
Khyber Pakhtunkhwa (KPK)	−0.614***	1.884	1.043
	(0.150)	(1.405)	(1.303)
Punjab (PUNJ)	−0.937***	1.488	0.526
	(0.121)	(1.406)	(1.302)
Constant	10.385***	6.846***	10.139***
	(0.814)	(2.123)	(2.154)
Observations	6662	1871	1580
R^2	0.471	0.468	0.478

Note. Dependent variable is market production. Market production equals total time invested in primary, secondary and trade production activities. In the regression results, 1 unit indicates 30 minutes. The number of children below 7 indicates an individual's number of children.

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Table B.5: OLS Estimation of Home Production Time - Men 25 - 65

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances	−0.062	0.222	−0.001
	(0.194)	(0.310)	(0.359)
Age (years)	0.023	−0.122	−0.183
	(0.033)	(0.110)	(0.129)
Age squared	−0.000	0.001	0.002
	(0.000)	(0.001)	(0.001)
Education (years)	0.026	0.042	−0.038
	(0.027)	(0.093)	(0.105)
Education squared	0.000	−0.000	0.004
	(0.002)	(0.007)	(0.008)
Marital Status (=1 married; =0 otherwise)	0.104	0.529	0.279
	(0.163)	(0.466)	(0.529)
Married and Children below 7	0.513***	0.088	0.524
	(0.153)	(0.592)	(0.681)
Number of Children below 7	0.072	0.257	0.193
	(0.052)	(0.227)	(0.265)
Personal Income	−0.009	0.004	0.006
	(0.023)	(0.061)	(0.071)
Jobless (=1 yes; =0 no)	1.936***	1.741***	2.081***
	(0.182)	(0.390)	(0.464)
Dummy for HH Head	0.305*	0.878	0.964*
	(0.156)	(0.541)	(0.582)
Age (HH head)	−0.002	−0.001	−0.016
	(0.005)	(0.016)	(0.017)
Female (HH head)	−0.073	0.659	−0.413
	(0.362)	(0.644)	(0.758)
Number of Elderly in the Household	0.068	0.277	0.669**
	(0.101)	(0.277)	(0.332)
Number of Children 6 - 15 Years Old	−0.023	−0.032	0.040
	(0.027)	(0.075)	(0.093)
Household Income	0.027	0.001	−0.028
	(0.022)	(0.066)	(0.078)
Ownership Status of the Dwelling	0.021	1.137	0.531
	(0.167)	(0.745)	(0.759)
Dummy for Piped-Water Connection	0.127	0.273	0.488
	(0.104)	(0.322)	(0.382)
Khyber Pakhtunkhwa (KPK)	0.683***	−0.075	−2.074
	(0.132)	(2.757)	(4.264)
Punjab (PUNJ)	0.024	−0.684	−2.241
	(0.096)	(2.761)	(4.262)
Constant	0.433	2.255	7.192
	(0.686)	(3.688)	(5.090)
Observations	5844	706	649
R^2	0.044	0.067	0.073

Note. Dependent variable is home production. Home production equals total time employed in household maintenance, care giving and community work. In the regression results, 1 unit indicates 30 minutes. The number of children below 7 indicates an individual's number of children.

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Table B.6: OLS Estimation of Home Production Time - Women 25 - 65

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances	0.566*	0.719**	1.001***
	(0.295)	(0.335)	(0.353)
Age (years)	0.035	0.110	0.300**
	(0.067)	(0.123)	(0.132)
Age squared	−0.003***	−0.004***	−0.006***
	(0.001)	(0.001)	(0.001)
Education (years)	0.240***	0.194	0.233
	(0.087)	(0.145)	(0.152)
Education squared	−0.016**	−0.012	−0.021*
	(0.008)	(0.012)	(0.013)
Marital Status (=1 married; =0 otherwise)	1.975***	0.743	0.982*
	(0.311)	(0.517)	(0.553)
Married and Children below 7	2.656***	2.980***	2.890***
	(0.322)	(0.653)	(0.687)
Number of Children below 7	1.256***	1.466***	1.534***
	(0.110)	(0.229)	(0.245)
Personal Income	−0.127*	−0.152*	−0.159
	(0.067)	(0.085)	(0.097)
Jobless (=1 yes; =0 no)	3.089***	2.665***	3.064***
	(0.210)	(0.383)	(0.409)
Dummy for HH Head	1.763***	1.756***	1.789***
	(0.580)	(0.631)	(0.688)
Dummy for Oldest Female in HH	−0.065	−0.961	−0.598
	(0.311)	(0.600)	(0.628)
Age (HH head)	−0.003	−0.005	−0.001
	(0.008)	(0.014)	(0.014)
Female (HH head)	−1.740***	−1.945***	−1.547**
	(0.527)	(0.591)	(0.629)
Number of Elderly in the Household	0.314	0.037	0.363
	(0.192)	(0.325)	(0.333)
Number of Children 6 - 15 Years Old	−0.154***	−0.138	−0.197**
	(0.057)	(0.095)	(0.098)
Household Income	−0.139***	−0.066	−0.105
	(0.034)	(0.064)	(0.068)
Ownership Status of the Dwelling	−0.226	0.643	0.303
	(0.363)	(0.730)	(0.752)
Dummy for Piped-Water Connection	0.619***	0.766**	0.779**
	(0.208)	(0.353)	(0.382)
Khyber Pakhtunkhwa (KPK)	−1.407***	−3.044	−3.323
	(0.261)	(2.456)	(2.262)
Punjab (PUNJ)	−0.156	−1.656	−1.958
	(0.211)	(2.457)	(2.260)
Constant	14.459***	14.265***	10.386***
	(1.417)	(3.712)	(3.739)
Observations	6662	1871	1580
R^2	0.375	0.408	0.424

Note. Dependent variable is home production. Home production equals total time employed in household maintenance, care giving and community work. In the regression results, 1 unit indicates 30 minutes. The number of children below 7 indicates an individual's number of children. * p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Table B.7: OLS Estimation of Leisure Consumption Time - Men 25 - 65

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances	2.167***	2.545***	1.977***
	(0.502)	(0.720)	(0.742)
Age (years)	−0.141*	−0.329	−0.157
	(0.086)	(0.256)	(0.267)
Age squared	0.003***	0.006**	0.004
	(0.001)	(0.003)	(0.003)
Education (years)	−0.035	−0.214	−0.011
	(0.069)	(0.216)	(0.217)
Education squared	0.020***	0.029*	0.004
	(0.005)	(0.016)	(0.016)
Marital Status (=1 married; =0 otherwise)	−0.202	0.301	−0.233
	(0.422)	(1.082)	(1.094)
Married and Children below 7	−0.609	−1.861	−1.658
	(0.396)	(1.373)	(1.408)
Number of Children below 7	−0.158	0.135	0.214
	(0.134)	(0.526)	(0.547)
Personal Income	−0.030	−0.054	0.059
	(0.058)	(0.142)	(0.147)
Jobless (=1 yes; =0 no)	11.255***	9.196***	9.496***
	(0.472)	(0.904)	(0.960)
Dummy for HH Head	−0.212	−0.487	0.042
	(0.404)	(1.255)	(1.205)
Age (HH head)	−0.038***	−0.107***	−0.092***
	(0.013)	(0.036)	(0.034)
Female (HH head)	0.793	1.770	1.707
	(0.937)	(1.494)	(1.568)
Number of Elderly in the Household	0.236	0.736	0.986
	(0.262)	(0.641)	(0.687)
Number of Children 6 - 15 Years Old	0.131*	0.219	0.103
	(0.070)	(0.175)	(0.193)
Household Income	0.070	0.146	0.163
	(0.058)	(0.153)	(0.161)
Ownership Status of the Dwelling	0.934**	−0.017	0.167
	(0.433)	(1.726)	(1.571)
Dummy for Piped-Water Connection	−0.775***	−0.269	−0.113
	(0.269)	(0.746)	(0.790)
Khyber Pakhtunkhwa (KPK)	2.984***	5.377	1.132
	(0.341)	(6.392)	(8.821)
Punjab (PUNJ)	−1.767***	0.711	−2.777
	(0.247)	(6.403)	(8.817)
Constant	40.246***	44.456***	44.154***
	(1.778)	(8.551)	(10.531)
Observations	5844	706	649
R^2	0.214	0.303	0.263

Note. Dependent variable is leisure consumption. Leisure consumption equals total time spent in social and cultural activities, mass media use, and personal care and maintenance. In the regression results, 1 unit indicates 30 minutes. The number of children below 7 indicates an individual's number of children.

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Table B.8: OLS Estimation of Leisure Consumption Time - Women 25 - 65

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances	0.667**	0.518	0.327
	(0.294)	(0.328)	(0.357)
Age (years)	−0.094	−0.042	−0.052
	(0.067)	(0.120)	(0.133)
Age squared	0.004***	0.003**	0.003**
	(0.001)	(0.001)	(0.002)
Education (years)	−0.111	−0.154	−0.171
	(0.087)	(0.142)	(0.154)
Education squared	0.011	0.011	0.011
	(0.008)	(0.012)	(0.013)
Marital Status (=1 married; =0 otherwise)	−1.162***	−0.646	−0.874
	(0.310)	(0.506)	(0.561)
Married and Children below 7	−2.257***	−2.385***	−2.475***
	(0.320)	(0.639)	(0.696)
Number of Children below 7	−0.699***	−0.707***	−0.919***
	(0.110)	(0.224)	(0.249)
Personal Income	0.364***	0.211**	0.228**
	(0.066)	(0.083)	(0.098)
Jobless (=1 yes; =0 no)	4.606***	4.960***	4.764***
	(0.210)	(0.375)	(0.415)
Dummy for HH Head	−1.686***	−1.389**	−1.330*
	(0.578)	(0.617)	(0.697)
Dummy for Oldest Female in HH	0.715**	0.659	0.625
	(0.309)	(0.587)	(0.636)
Age (HH head)	−0.007	−0.012	−0.017
	(0.008)	(0.013)	(0.014)
Female (HH head)	1.073**	1.098*	0.835
	(0.525)	(0.578)	(0.637)
Number of Elderly in the Household	−0.276	−0.376	−0.339
	(0.191)	(0.318)	(0.337)
Number of Children 6 - 15 Years Old	0.057	−0.115	−0.083
	(0.057)	(0.093)	(0.100)
Household Income	0.090***	0.273***	0.254***
	(0.034)	(0.062)	(0.068)
Ownership Status of the Dwelling	−0.293	−1.101	−0.598
	(0.362)	(0.715)	(0.762)
Dummy for Piped-Water Connection	−0.099	0.509	0.528
	(0.207)	(0.346)	(0.387)
Khyber Pakhtunkhwa (KPK)	2.196***	1.579	5.292**
	(0.259)	(2.404)	(2.292)
Punjab (PUNJ)	−0.368*	−0.859	2.760
	(0.210)	(2.405)	(2.289)
Constant	34.753***	33.646***	31.187***
	(1.411)	(3.633)	(3.788)
Observations	6662	1871	1580
R^2	0.322	0.372	0.362

Note. Dependent variable is leisure consumption. Leisure consumption equals total time spent in social and cultural activities, mass media use, and personal care and maintenance. In the regression results, 1 unit indicates 30 minutes. The number of children below 7 indicates an individual's number of children.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

Table B.9: OLS Estimation of Learning Time - Men 18 - 24

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances	−0.209	0.321	−0.508
	(0.364)	(0.633)	(0.708)
Age (years)	−3.853***	−8.567**	−5.363
	(1.176)	(3.530)	(3.954)
Age squared	0.086***	0.192**	0.119
	(0.028)	(0.085)	(0.096)
Education (years)	0.172**	0.343	0.200
	(0.068)	(0.223)	(0.247)
Education squared	0.002	0.002	0.013
	(0.006)	(0.017)	(0.019)
Marital Status (=1 married; =0 otherwise)	−0.143	−0.008	0.026
	(0.354)	(1.102)	(1.293)
Married and Children below 7	0.339	1.060	−1.774
	(0.688)	(2.767)	(2.883)
Number of Children below 7	−0.093	−0.323	0.752
	(0.354)	(1.349)	(1.352)
Personal Income	−0.105**	−0.066	0.090
	(0.053)	(0.167)	(0.194)
Jobless (=1 yes; =0 no)	5.499***	3.184***	4.149***
	(0.300)	(0.773)	(0.845)
Dummy for HH Head	0.017	−0.703	−0.823
	(0.483)	(1.595)	(1.588)
Age (HH head)	−0.001	−0.016	−0.003
	(0.010)	(0.029)	(0.030)
Female (HH head)	0.387	0.648	−0.358
	(0.389)	(0.688)	(0.765)
Number of Elderly in the Household	0.251	0.584	0.629
	(0.224)	(0.620)	(0.664)
Number of Children 6 - 15 Years Old	0.001	0.189	0.033
	(0.062)	(0.167)	(0.213)
Household Income	−0.018	−0.070	−0.279*
	(0.045)	(0.129)	(0.142)
Ownership Status of the Dwelling	−0.550	−0.957	−1.110
	(0.423)	(1.390)	(1.671)
Dummy for Piped-Water Connection	0.001	−0.147	−0.001
	(0.240)	(0.668)	(0.716)
Khyber Pakhtunkhwa (KPK)	−0.228		1.477
	(0.324)		(5.617)
Punjab (PUNJ)	−0.052	0.199	1.692
	(0.232)	(0.633)	(5.615)
Constant	43.053***	94.295**	60.053
	(12.141)	(36.483)	(40.853)
Observations	1578	336	283
R^2	0.361	0.261	0.287

Note. Dependent variable is learning time. Learning time equals total time invested in learning activities (activity group 7). In the regression results, 1 unit indicates 30 minutes. The number of children below 7 indicates an individual's number of children.
* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

Table B.10: OLS Estimation of Learning Time - Women 18 - 24

	(1) Unmatched β / SE	(2) Nearest β / SE	(3) Caliper β / SE
Remittances	−0.018	0.115	0.018
	(0.189)	(0.259)	(0.309)
Age (years)	−1.780***	−3.393**	−5.088***
	(0.687)	(1.441)	(1.695)
Age squared	0.039**	0.077**	0.117***
	(0.016)	(0.034)	(0.041)
Education (years)	0.034	0.065	0.032
	(0.046)	(0.092)	(0.114)
Education squared	0.016***	0.012	0.018*
	(0.004)	(0.007)	(0.009)
Marital Status (=1 married; =0 otherwise)	−0.731***	−1.217***	−1.071**
	(0.179)	(0.365)	(0.435)
Married and Children below 7	−0.134	0.296	0.099
	(0.256)	(0.587)	(0.689)
Number of Children below 7	0.213*	0.128	0.097
	(0.110)	(0.265)	(0.318)
Personal Income	−0.114	−0.086	−0.173
	(0.075)	(0.145)	(0.181)
Jobless (=1 yes; =0 no)	0.424***	0.667**	0.930**
	(0.157)	(0.308)	(0.361)
Dummy for HH Head	0.336	0.458	0.898
	(0.468)	(0.637)	(0.766)
Dummy for Oldest Female in HH	0.452**	−0.215	−0.062
	(0.180)	(0.401)	(0.456)
Age (HH head)	0.002	−0.000	0.006
	(0.005)	(0.010)	(0.012)
Female (HH head)	−0.118	0.026	0.030
	(0.229)	(0.304)	(0.370)
Number of Elderly in the Household	−0.002	0.024	0.049
	(0.125)	(0.236)	(0.264)
Number of Children 6 - 15 Years Old	−0.019	−0.031	0.032
	(0.039)	(0.073)	(0.088)
Household Income	−0.002	0.022	−0.013
	(0.025)	(0.052)	(0.062)
Ownership Status of the Dwelling	0.099	0.519	0.735
	(0.254)	(0.615)	(0.729)
Dummy for Piped-Water Connection	0.434***	0.251	0.137
	(0.143)	(0.269)	(0.318)
Khyber Pakhtunkhwa (KPK)	0.149	1.242	1.915
	(0.180)	(1.596)	(1.940)
Punjab (PUNJ)	0.051	0.971	1.748
	(0.152)	(1.604)	(1.950)
Constant	19.885***	35.381**	51.768***
	(7.135)	(14.870)	(17.492)
Observations	2115	663	516
R^2	0.162	0.153	0.178

Note. Dependent variable is learning time. Learning time equals total time invested in learning activities (activity group 7). In the regression results, 1 unit indicates 30 minutes. The number of children below 7 indicates an individual's number of children.
* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.