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Migration as a Substitute for Informal Activities: Evidence from Tajikistan

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Abstract

How is migration related to informal activities? They may be complementary since new migrants may have difficulty finding employment in formal work, so many of them end up informally employed. Alternatively, migration and informality may be substitutes since migrants' incomes in their new locations and income earned in the home informal economy (without migration) are an imperfect trade-off. Tajikistan possesses both a very large informal sector and extensive international emigration. Using the gap between household expenditure and income as an indicator of informal activity, we find negative significant correlations between informal activities and migration: the gap between expenditure and income falls in the presence of migration. Furthermore, Tajikistan's professional workers ability to engage in informal activities enables them to forgo migration, while low-skilled non-professionals without post-secondary education choose to migrate instead of working in the informal sector. Our empirical evidence suggests migration and informality substitute for one another.

1. Introduction

All economies contain some form of informal/unreported activity. This paper considers the influence migration has on this type of activity. We argue that migration and informal sector activity are viable options for the household.

The migration literature going back to at least Harris and Todaro (1970) and the papers by, for example, Fields (1975, 1976, 1979) and Gang and Gangopadhyay (1987a,b,c), generally introduce the informal sector as a complement to migration – that is, the informal sector becomes a staging ground for those trying to get formal sector jobs, part of the process that drives modern economic growth and, frequently, urbanization. In these models informal sector work and migration are complementary: migrants have difficulty finding employment in formal work in "new" places, so many of them end up informally employed. The informal sector is in the migrant's destination location, along with the good jobs the migrant is hoping to get. It is also possible for the informal sector – if it pays enough – to be the migrant's desired employment.

Our approach is somewhat different as we consider informality and migration as possible alternatives to one another. While the informal sector may be part of the process of economic growth and growing urbanization described in the previous paragraph, the informal sector may also be a home for entrepreneurs, a place to supplement "regular" earnings, or, alternatively, a home of last resort where the vulnerable end up during periods of economic hardship. This is local informal activity and this is the focus of our investigation into a trade-off between migration and informality. As substitutes, migration may effectively "crowd out" informality: migrant's earnings help improve families' finances encouraging their members to be less involved in informal employment. This structure has not been generally addressed in migration models. Thorbecke (1999) describes the co-existence of modern and informal/traditional sectors in both urban and rural regions, modeling their linkages via social accounting matrices. Building on the Harris and Todaro (1970) model, Gang and Gangopadhyay (1987c) allow for regular and informal employment in both urban and rural regions, with the possibility of open urban unemployment. With this extra complexity, whether migration out of the

rural region and rural informality are substitutes or complements depends on relative wages and the various labor supply and demand elasticities.

Using the Living Standards Measurement Survey (LSMS), our stage is Tajikistan, a poor Central Asian economy and former Soviet Republic possessing both a very large informal sector and extensive external migration. Our aim is to define the direction of correlation between informality and migration, and to examine nuances of the relationship. In the next section we provide a short introductory background to the major economic events in Tajikistan's recent history, emphasizing elements that are important to our story. We then discuss our approach to measuring informal sector activity; we discuss the data used in this study, report on the results and draw our conclusions.

2. Background

Tajikistan underwent severe economic, social and political changes following its separation from the USSR. Independence in 1991, with its rupture of economic ties, was followed by civil war among rival regional clans from 1992 to 1997 and then an initially tenuous peace. Tajikistan's GDP fell by 65% from US$2.6 billion in 1990 to US$921.8 million in 1997, while inflation peaked at 1207.2% using the GDP deflator in 1993, two years after independence, and was still at 65.2% in 1997 (World Bank, 2011).

After reaching reconciliation in 1997, the joint government initiated strict fiscal and monetary policies, along with the privatization of small and medium state owned enterprises, and price and trade liberalization.[1] For the last decade annual real GDP growth has averaged 8.4%, and the inflation rate was also moderated at average annual rate of 20.5% over the decade 2001–2010 (World Bank, 2011). Despite these positive developments, Tajikistan remains the poorest country among former Soviet countries with 47.2% of its population living below the poverty line in 2009 (United Nations, 2011). Average monthly wages were US$83 in 2010; 8.5 times lower that in Russia (Statistical Committee of CIS, 2011). For agriculture, forestry and fisheries, which provide jobs to 50% of the employed population, monthly wages average US$42 (Statistical Agency of Tajikistan, 2011).

The institutional transformation in Tajikistan was slowed by its civil war. The absence or weaknesses of newly established institutions spurred the increase of the informal sector in Tajikistan. Severe economic conditions during the war and post-war recovery period reduced the number employed in state enterprises. Extremely low wages and economic recession drove many employees of state-owned enterprises and kolkhozes (collective farms) to self-employment and migration. Tajikistan's Statistical Agency reports the official unemployment rate as increasing from 0.4% in 1992 to 2.9% in 1998, though this is generally recognized as an understatement. An informal consensus suggests in 1999 the unemployment rate was above 40%,

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[1] The presidential election and the first multi-party elections were held in Tajikistan in 1999 and 2000 respectively, after reaching the reconciliation between confronting parties in 1997.

including hidden unemployment (Noda, 1999). Financial constraints for families increased after the loss of savings collected during the Soviet period due to high inflation. Families in Tajikistan were not able to solely rely on wages as a source of income, as they did during the Soviet time. The average monthly wage in 1998 was 8,287 Tajik Rubles (US$9.9 at the official National Bank rate), far less than the internationally recognized subsistence level of "one dollar per day". In 1996, the real monetary income was 38.9 % of the 1991 level (Robertson, 1999). Such conditions led to the increase of the shadow economy and informal sector in Tajikistan.

In 2006, the size of the shadow economy in Tajikistan reached 60.9% of GDP, tax avoidance amounted to about one-third of GDP, and home production of food was 14.7% of GDP, while income from in-kind wages and barter exchange was 13.1% of GDP. Informal employment is common in Tajikistan, with only 46% of household members who are in the labor force employed in formal sector work in 2006. Moreover 45.4% of respondents received income from informal employment that was 2.7 times higher than the income from formal employment (United Nations Development Programme, 2007).

Tajikistan is a country with significant external migration, such that approximately 37% of the labor force is working outside of the country. Most emigrants go to Russia (95.3% of migrants, 2007 World Bank Living Standard Measurement Survey (2007 WB LSMS)). Increasing migration led to the increasing inflow of remittances into Tajikistan, which in its turn helped to support positive economic growth. Tajikistan became the most remittance dependent country in the world. In 2009, the total received remittances were counted as 35% of its GDP (World Bank, 2011).

According to 2007 WB LSMS, the international labor migration from Tajikistan is dominated by men (93.5%), from rural areas (76.4% of all migrants), and ethnically Tajik (81.4% of all migrants). Only 10.7 % of migrants had obtained post-secondary schooling; 76.2% graduated from secondary schools. The majority of current migrants were unemployed, 66.5%, and only 26.6% of migrants were working before migration; and, the remaining were students, pupils or militants. 6.6% of migrants remitted both in-kind and in cash in last 12 months; 74.2% remitted in cash only, and 1.0% remitted in-kind only.

We can draw out of this that Tajikistan was an economy in crisis during most of the first decade of separation from the Soviet Union. Over the second decade the economy has become stable and growing, yet marked by two potentially problematic features: a very large informal sector and extensive emigration. The remainder of this paper analyses the relationship between these two phenomena and examines their implications for households and the economy.

3. Measuring Informal Sector / Unreported Activity

The purpose of this paper is to document the impact migration has on informal and unreported activity. To do so we follow the approach used in Dimova, Gang and Landon-Lane (2006) which looks at income and expenditure information at the household level to determine the amount of informal / unreported activity for each household. There are many definitions of informal activity including, but not limited to, activity in organizations that have less than 5 employees, activity in organizations that do not use modern production techniques (sometimes referred to as traditional sector employment), employment in activities that do not have employment protections, and employment in organizations that do not have access to formal capital markets. In this paper we do not make a distinction among these definitions but rather look for evidence that a household is spending considerably more than its total income. This, we believe, is a good indicator of the unreported activity in an economy. A large component of this unreported activity is informal sector activity.

To measure the size of unreported activity we turn to income and expenditure data at the household level. Total income is computed as including total receipts from employment, net transfers from government agencies, remittances from household members living away from home, the market value of assets consumed (e.g. livestock, vegetables etc.), and the market value of labor services rendered for which payment was in kind. Total expenditure for a household includes total payments for good and services consumed, the market value of goods and services consumed where payment was made in kind, the market value of assets consumed, and the value of savings (or asset accumulation). We measure total reported income and total reported expenditures, with the excess of total expenditures over income regarded as unreported income.

There are many reasons why there would be a discrepancy between households' reported expenditures and income, such as non-reporting of informal sector income, memory recollection problems, or problems assigning market prices to in-kind consumption or income. Our analysis looks at the variation in this discrepancy across different households and in particular we look at the differences between households that contain migrants and those that do not. Our assumption is that the only major

difference between these households is that households with migrants receive observed remittance income.

We use the household as the unit of analysis since expenditures are difficult to assign to any one individual. While the source of formal sector income can often be assigned to an individual, in keeping with our idea of the informal sector, informal income invariably cannot. Formal sector employees may have a second informal sector job; an apparently non-working member of the household may in fact be employed in the informal sector; or children may be participating in the informal sector. People may participate in both formal and informal activities.

Our approach is different from much recent work on the informal economy, which has followed a paradigm set out by International Labour Organization (ILO) and World Bank staff. The approach is nicely summarized in Perry et al. (2007), and synthesized with some earlier approaches especially in Box 1.1 (page 27). The idea is that there are two main definitional strands: the earlier "productive" and the more recently fashioned "legalistic". The productive categorization defines informality, as its label implies, by the production attributes of a firm: for example, a firm might be defined as informal if it employs less than 5 people and uses mechanical power or less than 20 people if it does not use such power. The legalistic categorization essentially distinguishes people who have social protection from those who do not. This approach has been used in labor economics and occasionally in international trade for decades, especially in distinguishing between covered and uncovered sectors. These two ways use information about the firm in which the individual is working to identify whether an individual is working in the informal sector. The approaches overlap with one another in their identification of who is in the informal sector, for example, workers employed by firms having limited capital and offering no formal labor market protections are counted by both approaches.

Our approach overlaps with these categorizations but the overlap is not defined along the same rows and columns useful for comparing the productive and legalistic categorizations. For example, our measure will capture those working in formal jobs as their first job, and who work in informal jobs as second or third jobs. The other approaches have difficulty with second and third jobs, even when reported, as individuals may re-

port industry characteristics of their first job which would make it look to the researcher that they were engaging in formal activity when in fact the majority of their income was sourced from informal activity. On the other hand, our approach does not capture informal activity by a household reporting income equal to expenditure.[2]

The main advantage of our approach is that it allows the use of the rich trove of survey data to examine informality and the link between informality and other aspects of the economy. By looking at the disparity between reported income and reported expenditures as evidence of informal sector activity, our approach does not need detailed information about the working environment (whether it be firm characteristics or worker protections) in order it to assign individuals (or households) to informal sector activity.

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[2] Recall and measurement error may also play a role here. To minimize this one could consider the difference between expenditure and income as indicating informal sector activity only if expenditure is significantly more than income (Dimova et.al. (2006)).

4. Empirical Analysis: Data used

This study uses the 2007 World Bank Living Standard Measurement Survey on Tajikistan.[3] The survey data is based on a representative probability sampling on: (i) Tajikistan as a whole; (ii) total urban and total rural areas, and (iii) five main administrative regions (oblasts) of the country: Dushanbe (the capital), Regions of Republican Subordination (RRS), Sogd Oblast, Khatlon Oblast, and Gorno-Badakhshan Autonomous Oblast (GBAO). This data provides a good basis for our analysis as it incorporates all relevant information on the flow of resources in and out of the household. The data is collected by interviewing 4860 households in two rounds from September to November 2007. The first round of interviews was conducted in September-October 2007, during the Ramadan period. The second round was conducted in October-November 2007 to gather additional information, and, to re-administer food consumption to take into account its changes because of Ramadan.

This survey asks questions on migration, education, health, labor market, housing, transfer and social assistance, subjective poverty and food security, as well as data for household's expenditure and income. Income variables include both cash and in-kind forms of remittances, scholarships, wages and bonuses, individual transfers, social assistance, pensions, income from selling harvest, farm animals and poultry (or their product) and other income. Expenditures include payments for food, education, transportation, payments for health and medication, mortgage payments, house utilities and rent, assistance provided to other individuals, payments for the land use, purchases related with land cultivation and harvesting, purchases of farm animal and poultry breeding, and their food. All income and expenditure variables are converted to monthly equivalent for each household in our estimations.

Table 1 reports the definitions of the variables used in the regression analysis. The dependent variable used is the natural logarithm of the ratio of reported expenditures to reported income, where income includes remittances from members of the household living away from the household. As described above the income and expenditure

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[3] http://go.worldbank.org/IPLXWMCNJ0

variables are computed from self-reported income and expenditure data that includes good or services given or received in kind. Households that report a larger expenditure than income clearly have unreported income. Based on earlier work this discrepancy includes informal sector income that is not reported in the income reports but does show up in the expenditure reports (see Dimova et.al. (2006)).

We investigate the relationship between remittance income (a household's income derived from a household member working away from home and sending money to the household) and informal sector income. We aim to see if these two sources of income are substitutes or complements. To do so we look to see if the presence of a migrant in a household or a recently returned migrant – that is, a member of the household has left the home and is potentially remitting income – has an impact on the amount of excess expenditure over income. Our assumption here is that this excess expenditure over income, while due to many factors including measurement error and recall error, is mainly due to the presence of unreported income. If a household substitutes informal sector income for remittance income then this would show up as a decrease in the excess expenditure over income.

We find that households with migrants have a lower ratio of expenditure to income. We interpret this as a substitution of unreported informal sector income for reported remittance income. We argue that as the difference is so large it is hard to believe that this drop in excess expenditure is due to systematic differences in potential reasons for an excess expenditure over income such as recall error and mis-pricing of in-kind consumption. Another possible reason for this is that there are systematic differences between migrant and non-migrant households with respect to their savings. It could be argued that migration causes income to increase to an extent that migrant households save some of their reported income thus lowering the observed excess expenditure over income. Of course this is a possibility but for the reasons outlined below is a extremely unlikely event. Tajikistan is poor with a large proportion of the population living on or below the poverty line. The average increase in expenditure shown in Table 2 is approximately 25% between returned migrant households and non-migrant households. If all the reduction in excess expenditure is due to increased savings then that would mean households save on average

10% of their income. This is an implausibly high number for a developing country whose population are living close to or below the poverty line.

Table 1: Variables Used in Regressions

Variable Name	Description
log(expenditure/income)	Difference of log of totally reported expenditure and log of totally reported income; the income and the expenditure are defined at monthly rates from all reported sources.
Migrant (abroad)	A dummy variable taking a value of 1 if a household has any current migrant who is currently abroad and 0 otherwise.
Migrant (returned)	A dummy variable taking a value of 1 if a household has an external migrant who was abroad for less than 12 months and recently returned and 0 otherwise.
Borrow	A dummy variable taking a value of 1 if the household borrowed money and 0 otherwise.
Vocational	A dummy variable taking a value of 1 if the highest level of education for the head of household is a vocational qualification and 0 otherwise.
University	A dummy variable taking a value of 1 if the highest level of education for the head of household is a University degree and 0 otherwise.
Single	A dichotomous variable taking a value of 1 if the head of household is single and 0 otherwise.
No. of children (<15)	Number of children in the household with ages less than 15.
No. of Elderly (>65)	Number of elders in the household with ages greater than 65.
Ethnic	A dummy variable taking a value of 1 if a head of household is a member of an ethnic minority group and 0 otherwise.
Urban	A dummy variable taking a value of 1 if a household lives in urban area and 0 otherwise.
Land	A dummy variable taking a value of 1 if the household has access to land and 0 otherwise.
Self-employed	A dummy variable taking a value of 1 if any member of the household owns his/her business or farm and 0 otherwise.
Professional	A dummy variable taking a value of 1 if a head of the household is employed in a professional occupation and 0 otherwise.

A second consideration is that while we do not have information regarding household savings in our sample there is evidence from other studies that suggest that very few Tajik households have bank accounts. The survey asks whether the household has a bank account and in the survey 99% of respondents did not have a bank account. Also, the ILO (2010, p.33) reports "It is interesting to note that whether or not one receives remittances appears to have little impact on the likelihood of having a bank account. Of all households

who receive remittances, 98% do not have a bank account, while 99% of households who do not receive remittances do not have an active bank account". Moreover, there are no differences between migrant and non-migrant households in terms of house ownership. It is very hard to argue that the observed reduction in the excess expenditure over income is caused by migrant households saving some of their new income.

We start with a model that has the difference in log expenditures to log incomes as the dependent variable and variables indicating whether there is a current migrant or a recently returned migrant in the household as an independent variable. We also include other household characteristics to check the robustness of our regression results. The additional variables used in the regression include whether the household had taken a loan to capture whether it was credit constrained (*Borrow*), and household demographic variables such as whether the household is a single household, that is the head of the household is single and has never been married (*Single*), the number of children under the age of 15 present in the household and the number of adults over the age of 65 in the household. We also include information as to whether the head of the household is a member of an ethnic minority as we want to allow forth potential that ethnic minorities are discriminated against in the informal economy as well as the formal economy.

We include education indicator variables to control for the possibility that unreported activity may be a function of one's education. The education variables we use is an indicator variable that takes the value of 1 if the highest level of education for the head of the household is a vocational training school *(Vocational)* or a University education (*University*).

The next set of variables describes the type of work undertaken by the head of household. We use the variable (*Self-employment*) to reflect whether anyone in the household is self-employed and the variable (*Professional*) to denote that the head of the household works in a professional job. A feature of Tajikistan is the fact that professionals such as doctors and lawyers are paid low wages by the state and it is standard for them to augment their income by taking clients "off the books" – low wages in Tajikistan have driven professionals look for additional, informal, earnings. Since professionals have wider social networks, access to information and flexible time it is easier to them to open own businesses or provide services to other institutes or people.

Such cases are common in developing poor countries. For example, Kinyanjui (2010) discusses a case of disempowered professionals in Kenya who do additional informal work after their normal working time. It is also common in Tajikistan to see a doctor practicing at home after hours, teachers providing after-school tutorship to students, lawyers practicing their clientele beyond their office times, all for "under-the-table" payments. Out-of-pocket payments are also common in hospitals and clinics (Falkingham, 2004). Professionals holding managerial positions in state agencies and enterprises in Tajikistan might also receive an "unofficial" income in forms of gifts or bribes. The corruption and bribery in Tajikistan is common and it has impacted every sector and level of state agencies (UNDP and the Center for Strategic Studies under the President of the Republic of Tajikistan, 2010). Non-professionals, on the other hand, have no access to bribes, since they work at lower occupations and have fewer opportunities to be involved into informal sector employment due their time and physically intensive work.

Finally we include a set of variables that aim to capture the opportunity set of households to find informal sector work. Such variables are whether the household lives in an urban area (*Urban*), and whether the household has access to land for cultivation (*Land*).

Sample summary statistics (means and standard deviations) for each variable are reported in Table 2 and Table 3. There are two samples used: the first is the sample of all households who report their positive total income and the second sample is the first sample restricted to those households who report an occupation. Included in this second sample are all those households who work. We see that the mean log ratio of expenditure to income is 0.97 which equates to a mean ratio of excess expenditure to income greater than 2.5. Thus there appears to be a large amount of unreported income in Tajikistan. We also break the sample into those households with a migrant who is currently away from home, a household which has a recently returned migrant, and those households with no migrant. The sample means show that households without any migrants have the largest excess expenditure over income with the households with a recently returned migrant having the smallest ratio of excess expenditure over income.

This suggests that unreported income of whatever source is being replaced with reported remittances from migrants.

We observe the same picture when we look at the incomes and expenditures separately. Households with migrants have a higher mean income and also a higher mean expenditure with households with returned migrants having the largest income and expenditure.[4]

Table 2: Summary Statistics: Full Sample and Migration

Variable	Full Sample		Migrant (abroad)		Migrant (returned)		No Migrant	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
log(expenditure/income)	0.97	1.36	0.75	1.24	0.64	1.48	1.05	1.37
Total Income	558.06	811.05	575.14	620.72	911.26	839.24	513.42	833.69
Total Expenditure	1371.11	1851.37	1305.72	1651.79	1686.79	2213.84	1347.85	1838.14
Migrant (abroad)	0.17	0.37	1.00	–	0.15	0.36	–	–
Migrant (returned)	0.10	0.30	0.09	0.29	1.00	–	–	–
Borrow	0.05	0.23	0.06	0.27	0.07	0.29	0.05	0.22
Vocational	0.11	0.31	0.08	0.27	0.13	0.34	0.11	0.31
University	0.19	0.39	0.13	0.33	0.13	0.34	0.21	0.41
Single	0.01	0.11	0.01	0.12	0.01	0.08	0.01	0.11
No. of children (<15)	2.20	1.70	2.04	1.74	2.48	1.75	2.20	1.69
No. of Elderly (>65)	0.30	0.58	0.30	0.58	0.22	0.53	0.31	0.58
Ethnic	0.21	0.41	0.19	0.39	0.22	0.42	0.22	0.41
Urban	0.35	0.48	0.24	0.43	0.25	0.43	0.38	0.49
Land	0.65	0.48	0.74	0.44	0.78	0.41	0.62	0.49
Self-employment	0.51	0.50	0.47	0.50	0.47	0.50	0.52	0.50
No. of observations	4391		733		447		3280	

Approximately a quarter of all households have a member who has migrated with 17% of households having a migrant who is currently abroad and 10% having a recently returned migrant. Note that some households have both a recently returned migrant and a currently abroad migrant. Very few households borrowed money in the survey period (approximately 5%) and less than 1% were households with a non-married head.

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[4] This is consistent with the story that migrants who are currently abroad may not have received their full compensation and so their remittances are less than the migrants who have returned and earned their full salary.

The education levels of migrant and non-migrant households are somewhat different. For the full sample only 19% of the households have a university educated head whereas for households with migrants only 13% of the households are university educated. Thus it appears that migrant households have lower education than non-migrant households. When we add in households with vocational training (non-university post-secondary education) we observe that 32% of non-migrant households have some form of post-secondary education whereas between 21% and 26% of migrant households have some form of post-secondary education.

Table 3: Summary Statistics: Sample of Reported Occupation by Heads of Households

Variable	All		Migrant (abroad)		Migrant (returned)		No Migrant	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
log(expenditure/income)	0.85	1.25	0.66	1.14	0.35	1.25	0.93	1.25
Total Income	611.27	848.36	660.53	615.52	1052.48	859.21	553.77	865.20
Total Expenditure	1422.88	1876.75	1406.10	1617.43	1693.86	2092.51	1400.00	1896.46
Migrant (abroad)	0.14	0.34	1.00	–	0.13	0.33	–	–
Migrant (returned)	0.10	0.30	0.09	0.29	1.00	–	–	–
Borrow	0.06	0.25	0.07	0.29	0.09	0.33	0.06	0.24
Vocational	0.13	0.33	0.10	0.30	0.14	0.35	0.13	0.34
University	0.25	0.43	0.18	0.38	0.18	0.38	0.27	0.45
Single	0.01	0.10	0.02	0.12	0.01	0.10	0.01	0.10
No. of children (<15)	2.15	1.62	1.97	1.67	2.38	1.63	2.16	1.61
No. of Elderly (>65)	0.12	0.37	0.14	0.38	0.13	0.42	0.12	0.36
Ethnic	0.21	0.41	0.17	0.38	0.22	0.41	0.22	0.41
Urban	0.36	0.48	0.22	0.41	0.24	0.43	0.40	0.49
Land	0.64	0.48	0.78	0.42	0.81	0.39	0.59	0.49
Self-employment	0.56	0.50	0.61	0.49	0.54	0.50	0.56	0.50
Professional	0.27	0.44	0.22	0.42	0.11	0.32	0.30	0.46
No. of observations	2799		381		278		2175	

Table 3 reports the same statistics for the subsample of households that report an occupation. This subsample is dominated by those who work so it is not surprising that the incomes and expenditures for these households are slightly larger than for the full sample. However, the comparisons between migrant and non-migrant households are qualitatively similar for the reduced sample as for the full sample.

In order to specify the partial, or marginal, impact that migration status of a household has on the differences we observe between log expenditure and log income, we require a multivariate analysis that includes an array of variables that may influence this difference. We now turn to regression analysis, reporting these results in the next section.

5. Regression Results

Table 4 reports the result of simple regressions with the log of the ratio of expenditures to income as the dependent variable and household characteristics as the independent variables. All models are estimated using ordinary least squares with the reported standard errors computed using 1000 bootstrapped replications.[5] Regression (1) is just the simple linear regression replicating the difference in means test between households with no current or recent migrants and households with current migrants and households with migrants who have recently returned (within the last 12 months). We see that households with current or recent migrants have significantly lower excess expenditure than households without any migrants. Households with a migrant who is currently abroad have excess expenditures that are 26.2% lower than the reference non-migrant households while households that have a recently returned migrant have excess expenditures that are 36.9% lower than the reference non-migration household. This supports our assertion that migrant income is a substitute for informal or non-reported activity. The full effect of the additional migrant income occurs after the migrant has returned but there is a significant impact even when the migrant is still abroad, most likely through remittances sent back to the household from abroad. This result is obtained using the full sample of households.

Regressions (2) – (4) report results for regression models that include the various household characteristics for the same sample. A number of important features are evident from these results. First, the coefficients on the two migrant indicator variables are consistent across specifications and are always significant. The result that income from migrant labor is a substitute for informal or non-reported activity is robust to our different specifications.

Regression (2) adds variables that indicate a household's education level and whether or not they borrowed money in the past month. The coefficient on the variable *borrowed* is significant and positive with households who borrow having about 27% more excess expenditure than households without any borrowing. This number is consistent across the other specifications as well. This result is not surprising as in this dataset

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[5] Using bootstrapped standard errors allow for us to control for unobserved heteroskedasticity without the need to commit to the exact form or commit to the clustering variable needed to compute clustered-robust standard errors.

reported income does not include loans while it would be expected that expenditure would reflect the additional income due to loans. Including the borrowing dummy variable, however, does not affect our result that migration significantly decreases the amount of informal sector or non-reported income for households. The education variables are not significant and therefore do not appear to impact the excess expenditures of a household.

Table 4: Regression Results

Dependent variable: log(expenditure/income)						
	Full Sample				Working Sample	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Migrant (abroad)	−0.262*** (0.053)	−0.265*** (0.053)	−0.260*** (0.052)	−0.325*** (0.050)	−0.278*** (0.063)	−0.274*** (0.063)
Migrant (returned)	−0.369*** (0.070)	−0.375*** (0.070)	−0.369*** (0.072)	−0.428*** (0.071)	−0.617*** (0.084)	−0.585*** (0.080)
Borrowing		0.276*** (0.088)	0.279*** (0.087)	0.260*** (0.090)	0.264*** (0.097)	0.265*** (0.098)
Vocational		0.004 (0.065)	0.022 (0.063)	0.021 (0.065)	0.083 (0.070)	0.064 (0.069)
University		−0.001 (0.047)	0.023 (0.047)	0.060 (0.051)	0.173*** (0.054)	0.047 (0.061)
Single			0.009 (0.203)	0.066 (0.192)	−0.145 (0.252)	−0.174 (0.231)
no. of children (<15)			0.015 (0.012)	0.004 (0.012)	0.003 (0.015)	0.006 (0.015)
no. of elderly (65+)			0.121*** (0.041)	0.083** (0.039)	0.081 (0.066)	0.080 (0.066)
Ethnic				−0.276*** (0.052)	−0.292*** (0.055)	−0.290*** (0.057)
Urban				−0.124** (0.063)	−0.111 (0.076)	−0.119 (0.077)
Land				0.294*** (0.064)	0.268*** (0.076)	0.270*** (0.076)
Self-employed				−0.198*** (0.043)	−0.036 (0.048)	0.086 (0.059)
Professional						0.349*** (0.073)
Self-empl* Professional						−0.323*** (0.100)
Constant	1.047*** (0.024)	1.033*** (0.028)	0.955*** (0.042)	1.013*** (0.075)	0.812*** (0.088)	0.700*** (0.093)
Observations	4391	4391	4391	4391	2799	2799
R^2	0.012	0.014	0.017	0.040	0.051	0.058

Regression (3) augments regression (2) with some household characteristic variables. The new variables that are included are an indicator variable on whether the household head is single and variables that indicate the number of young people in the house and the number of elderly people in the house. The marital status of the head of household and the number of young people under the age of 15 in the household do not significantly affect the excess expenditure for the household but the number of elderly does. This is not surprising as the pension paid to retirees in Tajikistan is very low and below the subsistence wage. Thus the elderly would need to augment their income. If this additional income was not reported in the formal income then we would expect to see an increased excess expenditure for the household as the augmented income would be likely to show up in the household expenditure.

Regression (4) adds in other household characteristics including the ethnicity of the head, whether the household is situated in an urban area, whether the household has access to cultivatable land, and whether any member of the household is self-employed. All of these variables significantly affect the excess expenditure of a household. Households with an ethnic minority head have excess expenditures that are 27.6% lower than Tajik households. Households that are located in urban areas have excess expenditures that are 12.4% less than households in non-urban areas while households that have access to cultivatable land have increased excess expenditures of the order of 29.4%. Finally households with members who are self-employed have lower excess expenditures to the order of 19.8%. The result that ethnic minority households have significantly lower excess expenditures suggests that these households are not able to generate as much informal sector income as other households. The results for the urban households and households who have access to cultivatable land are consistent with each other. Households in rural areas have more opportunity to grow their own food which is included in the expenditures but not included in incomes.

The consistent result, however, is that households with migrants, have significantly lower excess expenditure than households without migrants. While not all of the discrepancy in reported expenditure over income can be attributed to informal sector activity, it is hard to believe that informal sector activity does not make up a large proportion of

the discrepancy. Other sources of the reported discrepancy are likely due to unreported consumption of assets (animal stock, food, etc.) or to incorrect pricing of such activities. As reported in Table 2 and Table 3 the magnitudes in the differences in excess expenditure between households with migrants and households without migrants is large. It is very hard to believe that this difference is due to differences between households in pricing of in-kind consumption or consumption of assets. In particular it is hard to believe that households with migrants are systematically better (or worse) at pricing non-market activities than households without migrants to such an extent as to explain the large change in excess expenditure seen in the data. Therefore, the decline in the discrepancy between expenditures and income is likely to be due to the fact that remittances are explicitly measured in this survey while informal sector income is not explicitly measured. Thus our results are consistent with the hypothesis that remittances from migrants are substitutes for informal sector income rather than complements.

Our regressions include controls for the other sources of income that are not included in the income data including loans and access to growing or rearing you own food. One source of additional income that we do not control for is additional income obtained by professionals "under-the-table." This income could not be considered informal sector income as the income is derived from activity that is identical to their formal sector income; the only difference is that it is not reported. In order to control for this we include a dummy variable for occupation but since households who are not working or unemployed do not report their occupation we include only working households in our sample. Regressions (5) and (6) are results using data from this restricted sample. Regression (5) is the same as Regression (4) with the only difference being the estimation sample while Regression (6) includes variables pertaining to a household's occupation; in particular a dummy variable if the household works in a professional occupation and the interaction between the professional dummy variable and the self-employment dummy variable.

The results are consistent with the first set of results that show that households with current or recently returned migrants having significantly lower excess expenditures than households without migrants. We also see that when restricting attention to only workers the significance of the elderly variable and the urban dummy variable dis-

appears. This is not surprising in that we lose those households who are retired and not working and those households in the rural areas that are not working. The new result is that households whose head works in a professional occupation have significantly higher excess expenditure thus suggesting that there is additional income being collected "under-the-counter." This is reinforced by the result that professional but self-employed households do not show a significant increase in excess expenditure. This is consistent with professionals who work in formal (and non-self-employed) jobs need to augment their income as their pay is low in their formal jobs.

The results reported above show that the discrepancy between reported expenditures and income for migrant households are significantly lower than those for non-migrant households. A possible criticism of the methods used would be that there are possible endogeneity biases present in our estimates that we have not modeled. However, in our specification the dependent variable is the amount of discrepancy between reported expenditure and reported income and it is not clear that excess expenditure over income would drive the decision to migrate. Certainly the total amount of expenditure (or income) might influence the migration decision but it is not clear that the component of expenditure that is unreported income would be a driver of the migration decision. Households would have to care about whether and from where their income was sourced for the excess expenditure over income to cause the migration decision.[6]

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[6] As a check, we have tried some possible instruments, including education variables, and find that the negative sign on migration is robust but that the magnitude is implausible large. The instruments that were tried had little theoretical motivation and were weak in the sense of having low first stage F-statistics. We therefore do not report the IV results for both of these reasons – i.e. the available instruments are weak and most likely not valid.

6. Conclusion

Over the last 20 years, Tajikistan experienced both increasing migration and informal sector employment. They both are relatively new phenomena in Tajikistan, a former Soviet country, where informal sector employment and international migration were strictly controlled and even "prohibited" by the Soviet Government. After the Soviet Union's collapse, these restrictions quickly untwisted, now involving an appreciably large proportion of the population. Such preconditions make Tajikistan a good case to study, where one does not need to be very concerned about historically well-established patterns and traditions of migration and informality (or look further into the historical and cultural elements of these processes), allowing us to focus on economic issues and factors which help to explain how these two processes interact. Moreover, the very large size of the migration has made it a relative low cost path for obtaining additional income, and there are many households in the sample who have a current or recently returned migrant.

We consider informality and migration as alternative income sources for the household – the two are part of the portfolio of the family. When informality is considered in the context of migration, it is almost always in the context of the migrant working in an informal job, or not. In the household model we are implicitly considering in this paper, it is quite reasonable that one member of the household might migrate while another works in the informal sector. This is in line with the portfolio theory of migration, in which family members work in different labor markets as an income diversification strategy.

The Living Standards Measurement Survey allows us to investigate the relationship between external migration and local informal sector activity. To do so we used the discrepancy between reported household expenditure and reported household income as an indication of informal/unreported activity. We understand that all of this discrepancy is not due to only informal sector activity. However, variation across household in this discrepancy is most likely due to differences in informal sector activity – broadly defined – other sources for this discrepancy between expenditure and income, such as measurement errors and memory retention error, are not likely to differ systematical-

ly across households. Using this measure of discrepancy between expenditure and income we investigate the linkages between migration and the size of informal sector activity. We do this by estimating an equation that explains the discrepancy between expenditure and income using household characteristics and migration status.

The overall result that we find is that there is consistent evidence that migration (accompanied by remittances) and home region informal sector activities are largely substitutes for one another. This result is robust across all of our regression specifications. We find that households with members who have externally migrated are less likely to participate in the domestic informal sector in that they have a significantly lower discrepancy between their reported expenditure and reported income. We do not believe that there is anything special about migrant households that enable them to better measure or remember their expenditure or income than non-migrant households so that we conclude that the significant drop in the discrepancy between expenditure and income is due to the substitution of remittances, which are observed, for informal sector income which is not observed.

Our work indicates that the ability of professionals to engage in informal activities enables them to compensate for the discrepancy between their expenditure and income without migrating. Migrants typically are low-skilled non-professionals without post-secondary education who lack informal sector opportunities or might have lower earnings in the local informal sector. Migrants find it less costly to migrate (more earning opportunities are abroad) than to be involved in local informal sector. Migration becomes a substitute for informal sector employment.

We have documented the existence of this phenomenon and suggested some ways to understand its source. More work is needed – other case studies, modeling how and why this form of the link arises. The result adds a considerable amount of complexity to our understanding of the decisions faced by households in less-developed economies. Work on informality and work on migration should not continue to ignore the connection.

References

Dimova, R. and I. Gang (2007). Self-Selection and Earnings during Volatile Transition. *Journal of Comparative Economics*, vol. 35(3), 612–629.

Dimova, R., I. Gang, and J. Landon-Lane (2006). The Informal Sector during Crisis and Transition, in Guha-Khasnobis B. and R. Kanbur (eds) *Informal Labour Markets and Development*, Palgrave-McMillan Press, 88–108.

Evans, D. and L. Leighton (1989). Some empirical aspects of entrepreneurship. *American Economic Review*, vol. 79(3), 519–535.

Falkingham, J. (2004). Poverty, out-of-pocket payments and access to health care: evidence from Tajikistan, *Social Science and Medicine*, vol. 58(2), 247–258.

Fields, G. (1976). "Labor Force Migration, Unemployment and Job Turnover," *The Review of Economics and Statistics*, MIT Press, vol. 58(4), 407–415.

Fields, G. (1975). "Rural-urban migration, urban unemployment and underemployment, and job-search activity in LDCs," *Journal of Development Economics*, Elsevier, vol. 2(2), 165–187.

Fields, G. (1979). "Place-to-Place Migration: Some New Evidence," *The Review of Economics and Statistics*, MIT Press, vol. 61(1), 21–32.

Gang, I. and Gangopadhyay, S. (1987a). "Employment, output and the choice of techniques: The trade-off revisited," *Journal of Development Economics*, Elsevier, vol. 25(2), 321–327.

Gang, I. and Gangopadhyay, S. (1987b). "Optimal Policies in a Dual Economy with Open Unemployment and Surplus Labour," *Oxford Economic Papers*, Oxford University Press, vol. 39(2), 378–87.

Gang, I. N. and Gangopadhyay, S. (1987c). Welfare Aspects of a Harris-Todaro Economy with Underemployment and Variable Prices. *The Developing Economies*, vol. 25, 203–219.

Grimm, M. and Günther, I. (2006). Inter and Intra-household linkages between the informal and formal sectors: a case study for urban Burkina Faso. Guha-Khasnobis B. and R. Kanbur (eds) *Informal Labour Markets and Development*, Palgrave-McMillan Press, 155–180.

Harris, J. and Todaro, M. (1970). "Migration, Unemployment and Development: A Two-Sector Analysis", *American Economic Review*, vol. 60(1), 126–142.

International Labor Organization (ILO), (1991). The Dilemma of the Informal Sector, International Labour Conference, Report of the Director General.

International Labor Organization (ILO), (2002). Decent Work and the Informal Economy. Report VI for the 90th International Labour Conference, Geneva.

International Labor Organization (ILO), (2010). Migrant Remittances in Tajikistan. Moscow: ILO Sub regional Office for Eastern Europe and Central Asia, International Labour.

International Monetary Fund (2002). Bulgaria. Recent Economic Developments and Statistical Appendix. IMF: Washington, DC.

Jovanovic, B. (1982). The selection and evolution of industry. *Econometrica*, 50, 649–70.

Kinyanjui, M. N. (2010). Social Relations and Associations in the Informal Sector in Kenya, *Social Policy and Development Programme Paper Number 43*, United Nations Research Institute for Social Development.

Lucas, R. (1978). On the size distribution of business firms, *Bell Journal of Economics*, 9, 508–23.

National Bank of Tajikistan (2011). *National Bank of Tajikistan.* Retrieved September 17, 2011, from Statistics of Real Sector: http://nbt.tj/ru/statistics/real_sector/

Noda, S. (1999, March). Aftermath of War in Tajikistan: Country Profile. ILO News Eastern Europe and Central Asia, p. 3.

Perry, G., Maloney, W., Arias, O., Fajnzylber, P., Mason, A., and Saavedra-Chanduvi, J. (2007). *Informality: Exit and Exclusion.* Washington, DC: World Bank.

Robertson, L. R. (ed.), (1999) *Russian & Eurasia Facts & Figures Annual*, vol. 25(2), Academic International Press.

Statistical Agency of Tajikistan (2011). *Database.* Retrieved September 17, 2011, from Statistical Agency of Tajikistan: http://stat.tj/ru/database/real-sector/

Statistical Committee of CIS (2011). *Average Monthly Nominal Wage in the CIS Countries, in national currency.* Retrieved September 17, 2011, from Statistical Committee of CIS: http://www.cisstat.com/index.html

Thorbecke, E. (1999). "A dual-dual framework to analyze intersectoral relationships throughout the development process", (Ch. 5) in: G. Ranis, Y-P Chu and S-C Hu (eds.) *The Political Economy of Comparative Development Into the 21st Century*, Edward Elgar Publishing, Ltd.

Tybout, J. (2000). Manufacturing firms in developing countries: how well they do, and why? *Journal of Economic Literature*, 38, pp. 11–44.

United Nations Development Programmeand the Center for Strategic Studies under the President of the Republic of Tajikistan (2010), *Corruption in Tajikistan – Public Opinion*. Retrieved October 17, 2011, from UNDP: http://www.undp.tj/files/undpeng.pdf

United Nations Development Programme (2007). *National Human Development Report 2007: Informal economy in Tajikistan.* Dushanbe: United Nations Development Programme.

United Nations (2011). *Population below national poverty line, total, percentage.* Retrieved September 17, 2011, http://data.un.org/Data.aspx?d=MDG&f=seriesRowID%3A581

World Bank (2011). *Migration and Remittances. Factbook 2011*. Second edition. Retrieved August 12, 2011, from World Bank: http://siteresources.worldbank.org/INTLAC/Resources/Factbook2011-Ebook.pdf

World Bank (2011). *World Data Bank*. Retrieved September 17, 2011, from World Bank: http://databank.worldbank.org/ddp/home.do?Step=12&id=4&CNO=2