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Does Rural Household Income Depend on Neighboring Communities? Evidence from Israel

by

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Does Rural Household Income Depend on Neighboring Communities?
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Ayal Kimhi*

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Abstract

In Israel, rural communities are those with up to 2000 residents, and rural areas include only rural communities. This paper explores the dependence of rural incomes on nearby urban areas. This dependence is mostly implied by rural-to-urban or urban-to-rural selective migration (or both). Migration flows can be affected by differential wages, housing costs and other amenities, and by commuting costs and costs of migration. An income generating equation, that includes characteristics of nearby urban communities as well as other spatial indicators among the explanatory variables, is estimated for rural households in Moshav villages using 2006 survey data. The results show that the population of nearby urban communities is significantly associated with rural household per-capita income. In particular, the urban population within 10 km is positively associated with per-capita income, while the urban population within 10 to 40 km is negatively associated with per-capita income. These opposite effects suggest that commuting costs are among the major determinants of the direction of the net migration of high-income households. Surprisingly, other spatial variables, including average per-capita income in nearby urban communities, do not affect rural income significantly.
Introduction

Rural-urban income disparity is a well known economic phenomenon. Changes in this disparity stem from shifts in the supply and demand for different types of labor that may be accompanied by two-sided rural-urban migration. Historically rural households derived most of their income from agriculture. The gradual decline of farm incomes has led to a reduction in farm activity. While some households that quit farming migrated to urban communities, others remained in the rural area and derived an increasing fraction of their income from non-farm sources. This process has been evident throughout the developed and developing world (Bryden and Bollman, 2000; Gardner, 2005). In addition, rural communities in developed economies that are rich in residential amenities attract urban households seeking quality of life (Rothwell et al., 2002; Mitchell, 2004). The direction of pressures on rural incomes resulting from these migration flows depends on whether the earning abilities of migrants are higher or lower than the earning abilities of the original farm population. This is an empirical question that has a bearing on rural population issues (Renkow and Hoover, 2000) as well as on rural-urban inequality (Henderson and Wang, 2005).

Topel (1986) discussed the impact of labor migration on local wages in a general equilibrium context. Bar-El (2006) suggested that the direction of labor migration could be determined by differential wages or by differential housing prices, or both. So et al. (2001) showed that joint residential and work choices are made according to wages, housing prices and commuting costs. Gould (2007) showed that white-collar workers earn more in cities than in rural areas, but could earn more than their rural counterparts even after migrating to rural areas. Renkow (2003) used a spatial county-level econometric model and found that most employment growth during the 1980s in North Carolina counties was accommodated by changes in commuting flows, and that labor force growth in rural counties is sensitive to employment growth in nearby urban counties. Roe and Stockberger (2004) showed the impact of the local community on dairy farms. El-Osta et al. (2007) found that the economic well-being of farm households is higher in metro counties.

There is ample evidence, then, that rural households are affected by nearby urban areas (Partridge et al., 2007). Theoretically, one can expect a positive association between rural and (nearby) urban incomes, because higher urban incomes can be enjoyed by rural residents who commute to town for work, and because of the flow of high-income urban families into nearby rural communities. On the other hand, one can think of situations in which the association is reversed. For example, higher urban incomes may attract the more capable rural residents and induce them to migrate (brain drain), thereby reducing rural incomes. Hence, whether higher (nearby) urban incomes are associated with higher or lower rural incomes is an empirical question.

This research will examine this question in the context of Israel. Israel is a good case study because (a) the changes in agricultural technologies, market conditions and agricultural and rural policy have been relatively fast; (b) recent institutional changes allowed a massive expansion of non-farm households in rural communities in the last decade; and (c) it is a relatively small country so that most rural communities are within a short commute from an urban center, and costs of migration are relatively low. We will analyze household income data for a sample of rural communities in Israel, surveyed in early 2006, and examine the association of rural income with income and other attributes
of nearby urban communities, the latter data derived from income and social surveys conducted by the Central Bureau of Statistics.

The next section provides relevant background on the rural sector in Israel. The following section introduces the unique organization of the sector. After that, I describe the empirical strategy and the data sources. The following section reports the empirical results. The paper ends with conclusions and avenues for future research.

Background

Agriculture was one of the most important foundations on which the state of Israel was established. Since the end of the 19th century, Jewish settlers in Israel saw agriculture as a channel through which the link between the Jewish people and their ancient homeland can be re-established. Cooperation has been the key to the success of settlement and agricultural production. The two dominating types of cooperative settlements have been the Kibbutz and the Moshav (Kislev, 1992). The Kibbutz was a commune in which each member produced according to his ability and consumed according to his needs (Lecker and Shachmurove, 1999; Ingram and Simons, 2002). The Moshav was a cooperative village made of individual family farms, in which certain activities such as purchasing, marketing, and financing were handled jointly in order to exploit economies of scale in these activities (Haruvi and Kislev, 1984; Schwartz, 1999; Sofer, 2001). A third type of cooperative settlement, Moshav Shitufi, was a compromise between Kibbutz and Moshav: production was handled collectively while consumption was handled individually. Ideologically, all three types of cooperative settlements explicitly highlighted farming as a way of life and not only as a way of making a living. Non-cooperative rural communities existed as well, but have been much less important in terms of population until the 1990s.

Economically, agriculture constituted a major fraction of national income (and exports in particular) for many years. Socially, the agricultural sector provided a generation of political, cultural and military leaders. After Israel declared its independence and masses of immigrants started pouring in, food security became one of the top priorities of the government. Many agricultural communities (especially Moshavim) were established in the early 1950s, mostly in remote areas, and populated by immigrants. The new settlers were provided with infrastructure and professional guidance in order to allow them to make a living from agriculture. Agricultural research was also promoted and financed by the government, and the resulting technological progress was remarkable.

In the 1970s, terms of trade of agriculture were already worsening, but the prosperity of agriculture continued thanks to the opening of export markets for fruits, vegetables and flowers. This has led to increased capital investments that were subsidized by the government. However, the inevitable decline of farming, experienced by virtually all countries during the development process, was around the corner. The reliance on exports made farmers more vulnerable to world price fluctuations and macroeconomic conditions. The unstable economic environment brought about by the high inflation in the late 1970s and early 1980s made farm income even more uncertain. The large debt due to the capital investments could not be serviced adequately (Kislev, 1993). The development of non-agricultural manufacturing and service industries provided an alternative source of income, especially for the high-ability farmers. Out-migration from
agriculture accelerated through two complementary channels. The first channel was by farmers selling their farms to urban families seeking rural-style residence (Kimhi and Bollman, 1999). The second channel was by continuing farmers who supplement their income by engaging in non-agricultural activities (Sofer, 2001; Kimhi, 2000). These included on-farm small businesses as well as off-farm businesses and jobs, located in part in the surrounding rural area and in part in nearby urban centers.¹

The farm debt crisis that followed the 1985 economy-wide stabilization plan was a major accelerator of this process. Many farms became practically delinquent due to the high real interest rates and could not serve as a source of income anymore. Many cooperatives collapsed, leaving their members without the safety net and support system that served them for decades (Kislev, Lerman and Zusman, 1991; Schwartz, 1999). Farmers were increasingly shifting to alternative income-generating activities, and while some of the more productive farms were able to acquire more farm resources and expand production, increasing fractions of land and other farm inputs were left unused.²

In the early 1990s, two significant structural changes took place. As a result of the Palestinian uprising, farmers found it more and more difficult to rely on Palestinian hired laborers. As a consequence, the government allowed farmers to bring in foreign workers (from Thailand) in numbers that increased year after year. This allowed farmers to rely more heavily on hired labor and increase the scale of their production. At about the same time, a mass migration wave from the former Soviet Union created shortage of housing. As a result, the government allowed farm communities to convert part of their agricultural land to non-agricultural uses, including both industrial parks and residential neighborhoods. This has also been viewed as a way to help farm families overcome the debt crisis. This policy provided farmers with more opportunities to develop non-agricultural businesses, and in addition allowed the communities to expand with the addition of many non-farm families that in some cases outnumbered the farm families. Both outcomes contributed to the accelerated decline in the importance of agriculture as a source of income in rural communities.³ Today, in most rural communities only a handful of families are living off agriculture. The population had become more heterogeneous, and inequalities within as well as between farm communities and regions have expanded (Sofer and Applebaum 2006).

The organization of the rural sector in Israel

The official definitions of urban and rural in Israel target individual communities rather than regions. In particular, urban municipalities are those with more than 2000

1 One should bear in mind that the concept of rural in a small country such as Israel is relative. Most rural residents live within a couple of hours drive from a major urban center. In addition, “development towns” were established in rural areas during the immigration wave of the 1950s, in order to provide hired labor to the farm communities. By the 1980, some of these towns (but not all) were prosperous enough to provide jobs for exiting farmers.

2 Legally farmers were not allowed to trade land and water quotas. This regulation was more or less self-enforced by the cooperatives, but after their collapse, and given the financial hardships of the farmers, it became common to lease land and water, mostly on a short-term basis.

3 Another outcome of the housing shortage was a boom in real estate prices. This allowed and still allows farmers in the central part of the country to sell off their farm to wealthy urban families who seek a rural residence and do not have any interest in farming.
residents, while rural municipalities are those with less than 2000 residents. Most rural communities are organized in regional councils. Originally, those included only Kibbutzim and Moshavim, but over the years, other rural communities have been added. Each regional council includes between three and sixty localities. Most of the regional councils are dominated by either Kibbutzim or Moshavim. The regional council acts as a municipal authority, in the sense that it is the lowest level that is authorized to collect municipal taxes. In the past, however, most of the municipal services have been delegated to the individual communities (the most notable exception is education). Following the breakup of the cooperatives, the local elected bodies lost their authority and their ability to handle municipal issues, and the regional councils have gradually taken over.

Each Kibbutz or Moshav is affiliated with a “settlement organization”. These organizations mostly reflect the political affiliation of the early settlers, and does not necessarily reflect the political viewpoints of the current population. The exception is perhaps the religious communities, which are affiliated with a particular settlement organization, and still keep a unique way of life that was not completely eroded over the years. However, since politics determines resource allocation at the national level, these affiliations may have long-lasting effects (Kimhi 1998).

By definition, rural areas in Israel are all those outside of urban localities. With a few exceptions, this includes the areas governed by the regional councils. This means that, in practice, there are numerous urban localities that are surrounded by rural areas. In this sense, the classification of rural and urban areas does not have a clear geographical dimension. This exacerbates the already problematic binary classification of geographic areas into urban and rural (Waldorf 2006). Over time, some rural communities cross the 2000 resident threshold and become urban. It is therefore not easy to define local labor markets in Israel using the definitions of rural and urban. On one hand, some rural localities are surrounded by urban areas. On the other hand, there are several remote areas, that are not within commuting distance from an urban center. Since the available data is very different for urban and rural communities, this poses a significant challenge for researchers.

Empirical strategy and data

This paper will use rural household data to estimate income-generating equations with an emphasis on spatial dimensions. Besides ordinary explanatory variables such as household demographic indicators, the equations will include community characteristics and will test for spatial dependence within the sample. In addition, the equations will include proximity to urban labor markets and the mean income in neighboring urban localities, as well as characteristics of the regional councils.

The main data source is a household survey that was conducted by telephone in Moshavim during March and April of 2006. Households were sampled from a database of residential telephone numbers. In a first stage, 101 Moshavim out of more than 400 were sampled randomly. In a second stage, up to eight telephone numbers were sampled randomly in each Moshav. About 40% of respondents agreed to be interviewed. Those who refused, were replaced by other households from the same Moshav. We particularly asked to interview the head of household or the person in charge of economic decisions. In case this person was not available, further attempts have been made to contact him or her in later times. The final sample included 842 respondents.
The respondents provided information on their and their household’s demographic characteristics, about their status within the Moshav (farm owner or resident), about their farm characteristics (when relevant), about the household’s main source of income and about the importance of agriculture as a source of income. Respondents were also asked about their gross income from different sources: farm income, non-farm business income, non-farm labor income, property income, and allowances. While we expected to have difficulties with the income questions, we were able to obtain income data from about 70% of the households. It should be noted that this was the first attempt to collect rural household income data since perhaps the 1995 census of population.

Additional data were collected from various sources. Moshav information, including exact location (coordinates), institutional affiliation, year of establishment, and 2002 population was obtain from official publications of the Central Bureau of Statistics. Income per-capita, location and population of urban localities were obtained from the same source. Several characteristics of the regional councils were obtained from a Ph.D. thesis that is still underway. Finally, we obtained official assessments of the value of a vacant housing plot in each Moshav from the National Land Authority.

Preliminary analysis showed that median rural income per capita is not very different from the median urban income per capita. However, income inequality among rural households is higher than among urban households. Figure 1 shows that farm-operating households have higher incomes than households residing on inactive farms, while the income of non-farm rural households is in between these two extremes. These income disparities have a considerable geographic dimension, with higher disparities in relatively remote regions. Figure 2 shows that slightly over a half of household income on active farms is derived from farming. Other households derive most of their income from nonfarm labor. Inactive farm owners are older on average, and this explains why they derive a larger fraction of their income from property and allowances. This also explains why their income is in general the lowest. The subsequent regression analysis will examine whether the income differences between types of households remains after controlling for demographics and other household and community attributes.

The household-level explanatory variables include personal characteristics of the head of household (age, education and gender), the demographic structure of the household (household size and the dependency ratio), and attributes of the farm (whether the household owns a farm, whether the farm is active, and landholdings). Several community-level explanatory variables are used. The relevance of institutional affiliation has been discussed before; it was also found to be associated with per-capita income (figure 3). Community size has also been found to be relevant (Smailes et al. 2002). We have access to data on Moshav population for 2002, and it was found to be positively correlated with per-capita income (figure 4). Distance from the four major metropolitan centers (Tel Aviv, Jerusalem, Haifa and Be’er Sheva) was computed. Finally, official assessments of the value of a vacant housing plot in each Moshav was obtained from the National Land Authority. These assessments are used for building-permit tax purposes.

A variety of spatial explanatory variables has been explored. First, sets of dummy variables for administrative regions or regional councils can be used. Second, several characteristics of regional councils have been collected. These include the mean per-capita income, the socio-economic rank (derived using a whole set of socio-economic
characteristics), per-capita municipal expenditures, and a measure of efficiency in providing municipal services. Finally, the population and income levels of nearby urban communities have been recorded by distance. For example, the urban population within 10 km was recorded as well as the mean per-capita income of this population. This has been repeated for distances of 10 to 40 km, and 40 to 70 km. Khan et al. (2001) found that a local labor market is defined by a commuting distance of about one hour, hence the statistics of urban population more than 70 km away was not used. Portnov (2004) found correspondence between the growth of small towns in Israel and their neighboring urban centers.

Results

The estimation results are in table 1. The dependent variable is log of per-capita monthly gross household income from all sources. The t-statistics are based on robust standard errors, clustered by village. The estimated coefficients imply that income is associated negatively with age (age squared was not significant when included) and positively with education. Income is lower in households headed by females. Income is also associated negatively with family size and the dependency ratio. All these demographic variables have the expected effects on income.

The coefficients imply that income is higher on active farms. An indicator of farms versus resident households was not found significant. Income is also increasing with landholdings. It should be noted that landholdings include all plots of the family farm, whether operated by the household or not. This variable perhaps captures the income potential of the farm once it is active. However, when adding the farm dummy the coefficient of landholdings becomes larger, meaning that landholding captures part of the difference in income between inactive farms and resident household, which is negative (figure 1).

Income is associated positively with village population. One can think of positive agglomeration externalities, both economical and social, as the natural explanation. If this is true, the effect of village population should decrease with the population of adjacent communities. An added interaction of village population and the urban population within 10 km, however, was not statistically significant. It could be that the agglomeration externalities are mostly related to within-village effects, such as efficiency in providing local municipal services and higher social prospects of (non-driving) children. Regarding institutional affiliation, the only significant income differential is between the two larger organizations (Tnu’at Hamoshavim and Hapo’el Hamizrashi) and the other (smaller) organizations. In particular, income is higher in villages affiliated with the smaller organizations. This may reflect the higher flexibility of these villages with respect to institutional constraint and ideology, which was prevalent in past years but could have lasting effects (Kimhi 1998).

The association of rural household income with the size of the nearby urban population is complex. Income is positively associated with the urban population within 10 km, but is negatively associated with the urban population between 10 and 40 km. The urban population beyond 40 km is not significantly associated with rural household income. As discussed before, the interaction of urban and rural communities is complex. Higher urban density in close proximity may attract rural households seeking better jobs or urban amenities but may also cause an urban-to-rural migration of urban households in
search of rural amenities. The cost of commuting may determine the dominant force among the two (Khan et al. 2001, So et al. 2001). In this sense, the results seem logical. In a village adjacent to urban centers, commuting is cheap, and hence rural residents can find urban jobs without the need to change residence, while urban residents can find rural housing without the need to change jobs. Hence, the high-income rural residents stay, while incoming migrants from the urban area are also likely to have high income relative to the rural population. This explains the positive association between rural incomes and nearby urban population density. When the urban areas are more distant, commuting costs are higher, the incentive for the urban workers to migrate is lower, while the incentive of the high-income rural workers to migrate to the urban area is higher. This explains the negative association between rural incomes and more distant urban population density.

Surprisingly, the average income in nearby rural communities does not affect rural incomes significantly. One could expect that average income is a better proxy for the attractiveness of urban jobs than population density, but this is not supported by the regression results. Likewise, neither of the following variables significantly affected rural household income: the average income in the regional council, the socio-economic rank of the regional council, the level of municipal expenditures by the regional council, the financial efficiency of the regional council, distance from the four major metropolitan centers, the official assessment of the value of a vacant housing plot in the Moshav.

Finally, an attempt was made to account for spatial dependence in the dependent variable (spatial lag) or in the error term (spatial error).¹ No significant spatial effects were found in the rural household income data.

Conclusions

In the last few years, evidence has emerged about spatial income dependence in rural areas, and in particular the dependence of rural incomes on nearby urban areas. This dependence is mostly implied by rural-to-urban or urban-to-rural selective migration (or both). Migration flows can be affected by differential wages, housing costs and other amenities, and by commuting costs and costs of migration. This paper explores the spatial rural-urban dependence for the case of Israel, by estimating a rural income generating equation that includes characteristics of nearby urban communities as well as other spatial indicators among the explanatory variables. Of all these variables, only the population of nearby urban communities was significantly associated with rural household per-capita income. In particular, the urban population within 10 km was positively associated with per-capita income, while the urban population within 10 to 40 km was negatively associated with per-capita income. These opposite effects suggest that commuting costs are among the major determinants of the direction of the net migration of high-income households.

It is disturbing that other spatial effects, especially the income of nearby urban communities, were not significant. Perhaps the reason is the somewhat artificial distinction between rural and urban communities in Israel, whereas communities with fewer than 2000 residents are considered rural, while larger communities are considered urban even if they are remote from major urban centers. One way to deal with this issue

¹ See Anselin (2002) for a review of this issue.
in future research is to examine alternative definitions of urban and rural areas based on the notion of local labor markets.

References


Roe, Brian, and Aaron Stockberger. *Explaining Economic Linkages Between Farms and Local Communities: Looking Beyond Farm Size*. Paper Presented at the 2004 AAEA Annual Meeting, Denver, CO.


Figure 1. Median monthly household income by region and type of household.

Figure 2. Household income distribution by source and type of household.
Figure 3. median per-capita income by institutional affiliation

Figure 4. median per-capita income by village population
Table 1. Estimation results of (ln) per-capita monthly gross household incomea

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-statistic</th>
<th>P-value</th>
<th>Sample mean</th>
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<tr>
<td>age</td>
<td>-0.01018</td>
<td>-2.22</td>
<td>0.029</td>
<td>50.333</td>
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<td>High school</td>
<td>0.46916</td>
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<td>0.280</td>
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<td>female</td>
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<td>0.003</td>
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<td>Active farm</td>
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<td>4.07</td>
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<td>0.245</td>
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<td>Landholdings (ln)b</td>
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<td>0.070</td>
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<td>Village population</td>
<td>0.00078</td>
<td>2.52</td>
<td>0.013</td>
<td>485.708</td>
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<td>Small organizationc</td>
<td>0.22694</td>
<td>2.11</td>
<td>0.037</td>
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<td>Urban population within 10 kmd</td>
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<td>2.67</td>
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<td>Urban population 10 to 40 kmd</td>
<td>-0.00018</td>
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<td>Urban population 40 to 70 kmd</td>
<td>1.79E-05</td>
<td>0.24</td>
<td>0.812</td>
<td>783.877</td>
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<tr>
<td>Intercept</td>
<td>7.89672</td>
<td>17.1</td>
<td>0.000</td>
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R-squared 0.1735
Number of observations 589
F(14, 102) 12.29

a. Robust standard errors, clustered by village, were used for inference.
b. Landholdings were measured in Dunams (0.23 acres). Zeros were changed to ones prior to taking the log transformation.
c. Dummy for villages associated with settlement organizations other than Tnu’at Hamoshavim and Hapo’el Hamizrachi.
d. Urban population measured in thousands.
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