Threshold Effects on Inter-Sectoral Migration of U.S. Farm Labor

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Poster prepared for presentation at the Agricultural & Applied Economics Association's 2011 AAEA & NAREA Joint Annual Meeting, Pittsburgh, Pennsylvania, July 24-26, 2011

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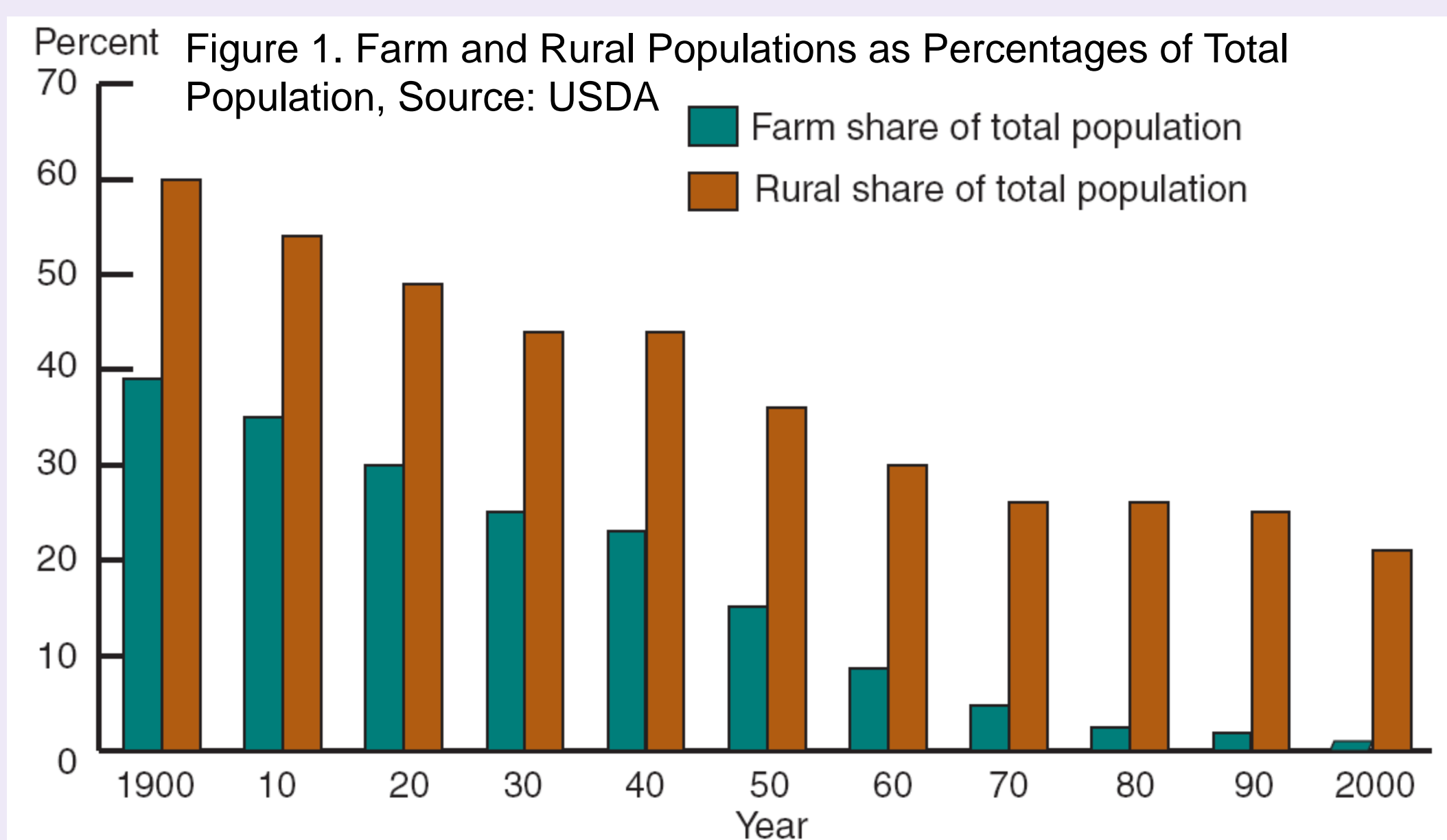**Gülcan Önel** *[§] and **Barry K. Goodwin** *

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Motivation

❑ Farm labor may migrate between farm and off-farm sectors as a result of time allocation and investment decisions that are motivated by wage differentials between sectors.

❑ In 2002, nearly 93 percent of farm households had off-farm income (USDA).

Figure 1. Farm and Rural Populations as Percentages of Total Population, Source: USDA

- Farm share of total population
- Rural share of total population

❑ There are unofficial barriers and costs associated with the reallocation of farm and off-farm labor such as travel costs, change in housing costs, the loss (or gain) of amenities, disutility created by habit persistence and other psychological costs borne by the migrating laborer.

❑ Given these adjustment costs, movement of labor between on-farm and off-farm jobs requires that the differences in returns to labor in two sectors must exceed a certain threshold in order to make the reallocation profitable or utility-maximizing.

❑ The implication of this in empirical modeling is that the functional relationships characterizing the labor migration models may be nonlinear (in parameters).

Model and Data

❑ We follow the conceptual model presented by Barkley (1990). Migration is defined as:

$$M_t = \frac{L_{t-1}^f - L_t^f}{L_{t-1}^f}$$

and it is a function of

$$M_t = f\left(r_{t-1}, g_{t-1}, u_{t-1}, lv_{t-1}, gov_{t-1}\right)$$

where **r** is the relative (nonfarm to farm) average product of labor, **g** is the relative size of labor force, **u** is nonfarm unemployment rate, **lv** is real value of farm land ,and **gov** is the fraction of direct government payments in net farm income.

❑ We use annual data from 1948-2010. They were compiled from BLS, BEA and USDA databases.

❑ The plot of migration variable, M, is shown in the following figure. There are noticeable outliers associated with the definitional changes in the BLS employment data. We add year dummies to the estimated model to account for these changes.

Out-Farm Sectoral Migration Variable, %
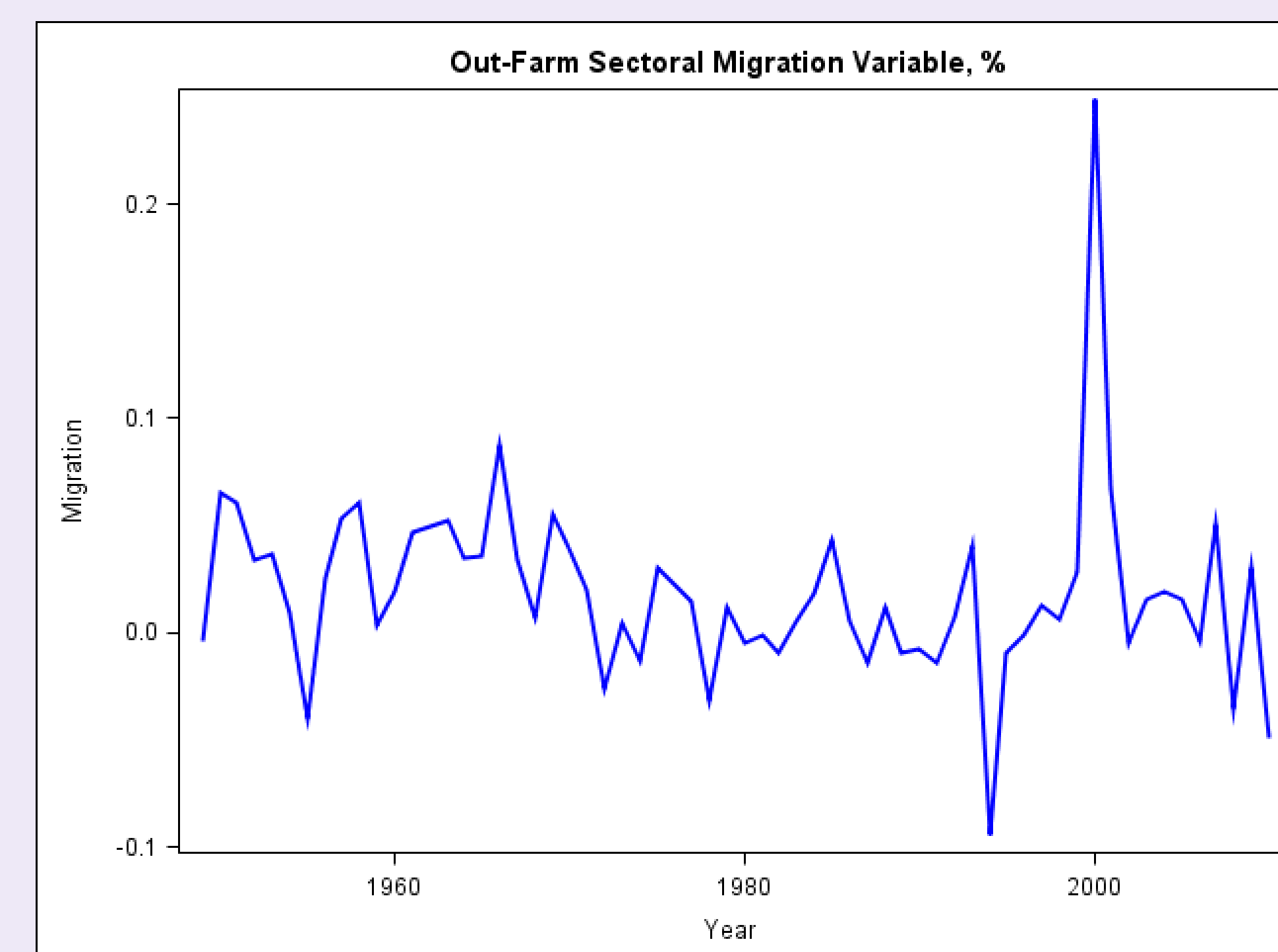
❑ The following figure shows that the discrepancy between nonfarm and farm labor productivity, which represents relative returns to labor between two sectors, increases over the sample period.

Results

Productivity of Labor in Farm and Nonfarm Sectors

APL_farm — APL_nonfarm
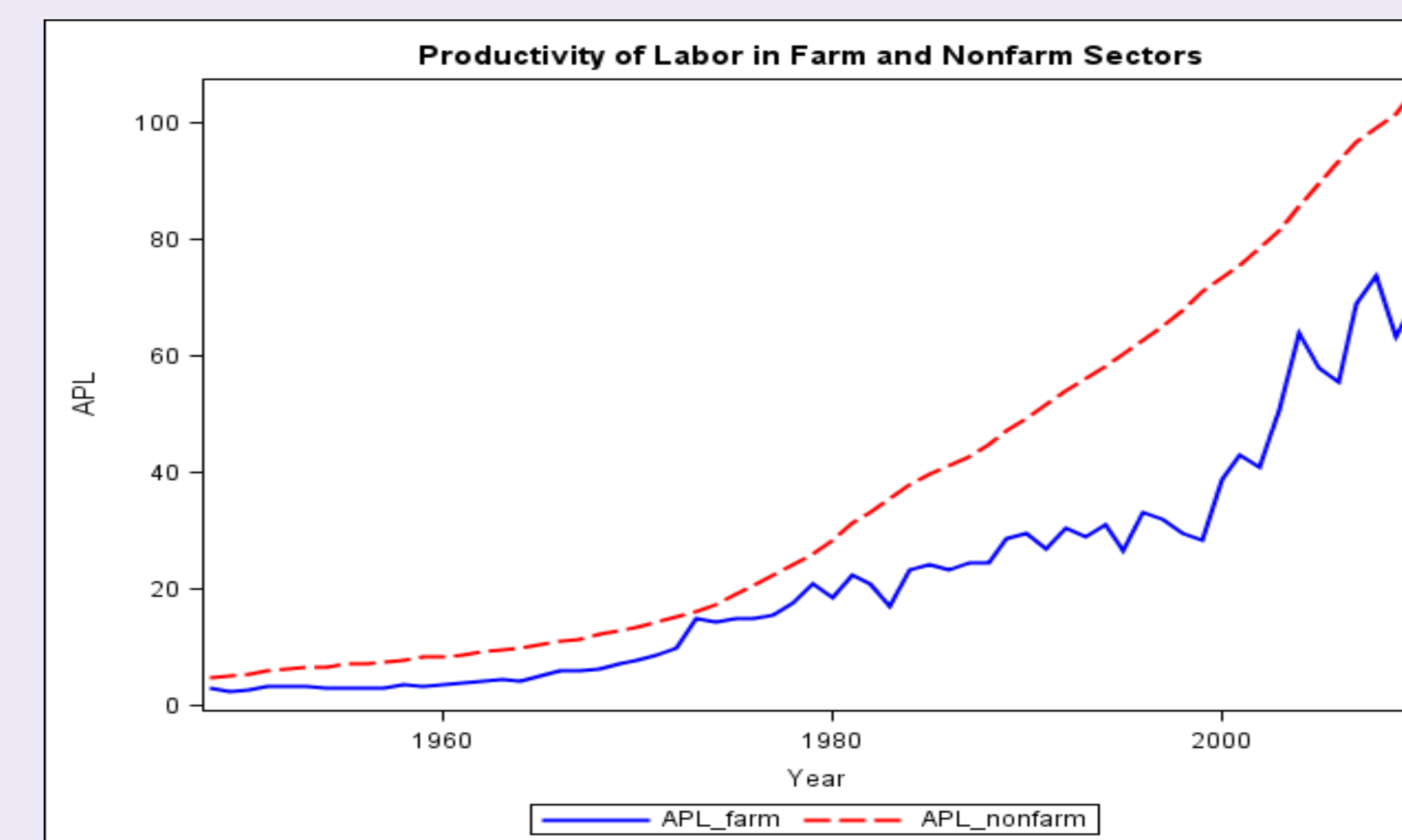
❑ We estimate the following two-regime inter-sectoral labor migration model. Regime 1 occurs when the discrepancy between returns to labor in farm sector and those achievable in the nonfarm sector (z) exceeds a certain threshold, c.

$$M_t = \delta \Gamma^{(1)} X_{t-1} + (1-\delta) \Gamma^{(2)} X_{t-1} + e_t$$

where $\delta = 1$ **if** $z \geq c$

❑ Threshold value, c, is estimated via a grid search that is based on minimizing Sum of Squared Residuals (SSR). The following figure shows all candidate values of *c* and corresponding SSR values.

Sum Squared Residuals with respect to Threshold Values
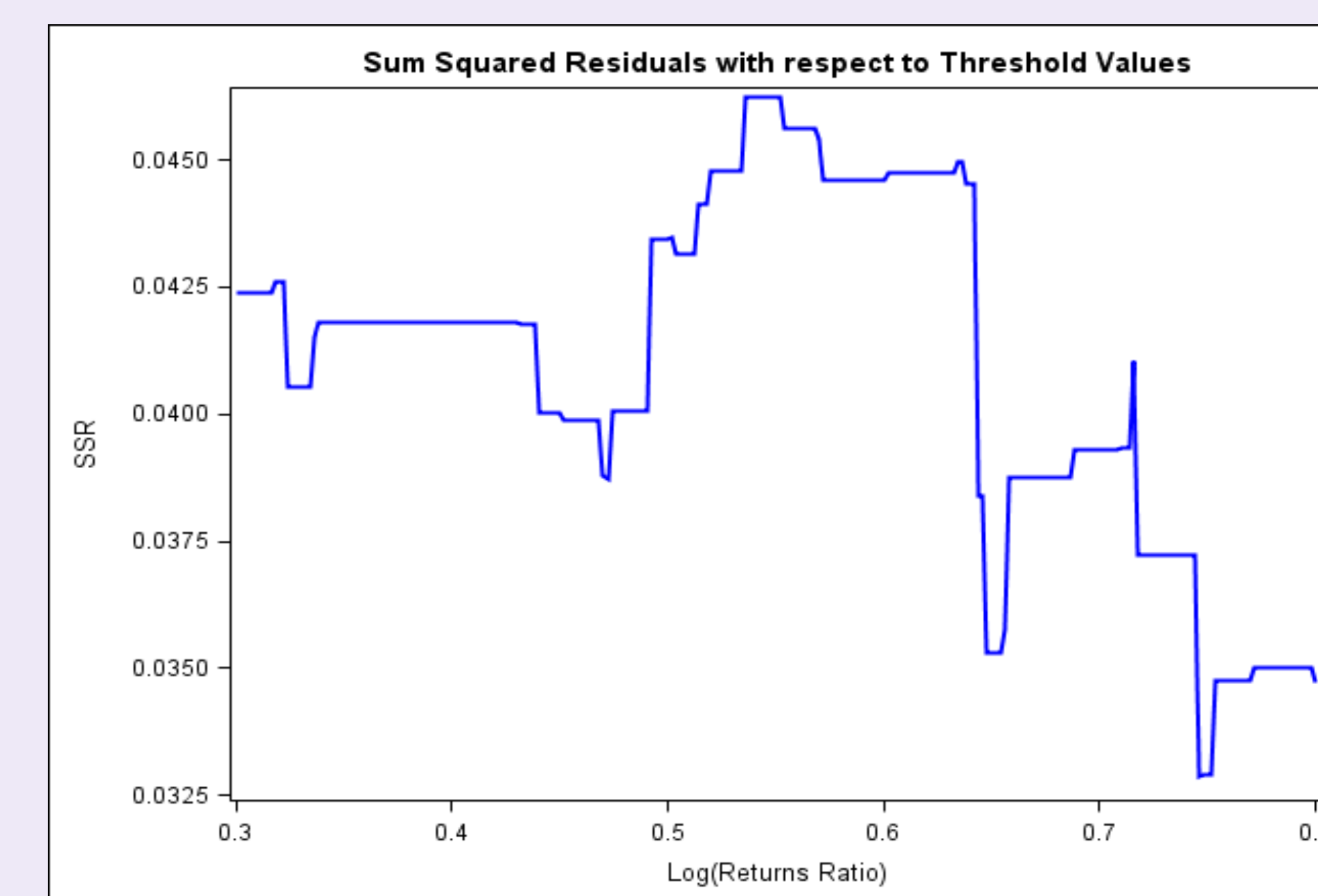
❑ If the log of the ratio of average product of nonfarm labor to average product of farm labor (a measure of relative returns to labor) exceeds 0.746, the migration model is governed by Regime 1 parameters, otherwise Regime 2 parameters.

Coefficient of:	Linear	Threshold	
		Regime1: Relative returns > 0.746	Regime2: Relative returns <0.746
Returns Ratio (r_{t-1})	0.126***	0.469*	0.118**
Labor Force Ratio (g_{t-1})	-0.160***	-0.314*	-0.103**
Nonfarm Unemployment Rate (u_{t-1})	-0.069***	-0.076	-0.031*
Real Land Value (lv_{t-1})	0.060	0.285	0.024
Direct Government Payments (gov_{t-1})	-0.003	0.009	-0.008

Estimation Results

❑ In Regime 1, in general, the effects of explanatory variables on out-farm migration are stronger than those observed in Regime 2.

Conclusion

❑ In this paper, we examine possible threshold effects on functional relationships characterizing inter-sectoral migration of farm labor.

❑ As opposed to Barkley (1990), we found the effect of relative labor force ratio to be negative. All other significant coefficients carry the expected signs.

❑ Land values and direct government payments seem to have no significant effect on migration of farm labor to nonfarm sectors.

❑ The significance of the threshold parameter, quality of the employment data (especially the outliers), and the unexpected signs on some of the estimated coefficients need further exploration.

Information

Preliminary, please do not cite.
Contact *gonel@ncsu.edu* for more information.