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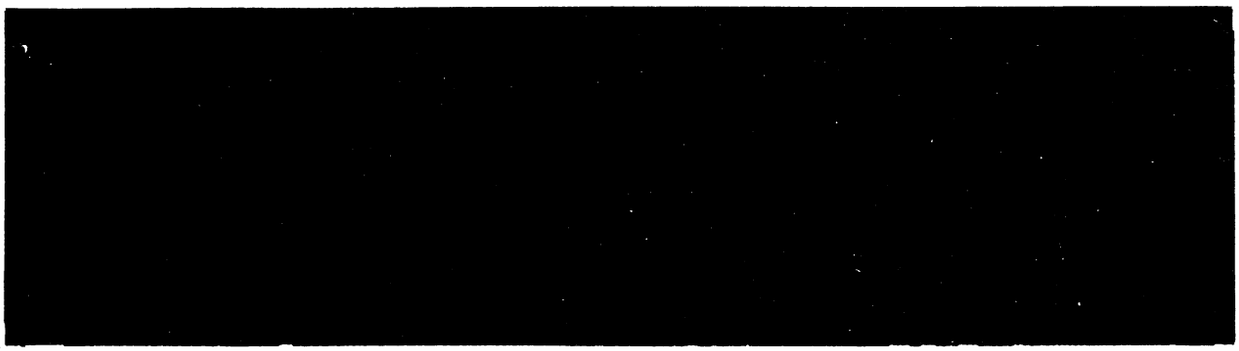

This paper was prepared under a cooperative agreement between the Institute for Policy Reform (IPR) and Agency for International Development (USAID), Cooperative Agreement No. PDC# 0095-A-00-1126-00. Views expressed in this paper are those of the author and not necessarily those of IPR or USAID.

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Political Freedom and the Response to Economic Incentives Labor Migration in Africa, 1972 - 1987

Andrew P. Barkley[*]
and
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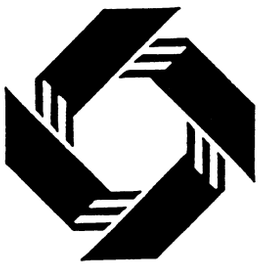

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Political Freedom and the Response to Economic Incentives Labor Migration in Africa, 1972 - 1987

Andrew P. Barkley[*]
and
John Mc Millan[#]

[*]*Assistant Professor, Department of Agricultural Economics*
Kansas State University

[#]*Staff Economist*
Institute for Policy Reform

September, 1992

Policy reforms in developing countries often address in isolation either an economic or a political problem. This study examines the interactions between political institutions and responses to economic incentives in a comprehensive framework. Migration data from thirty two African countries were used to quantify the statistical relationship between political institutions and labor migration out of agriculture. Regression results indicate that the presence of political freedoms and civil liberties increases the responsiveness of labor migration to economic incentives.

Political Freedom and the Response to Economic Incentives: Labor Migration in Africa, 1972-1987.

Development economists have increasingly promoted free markets within nations and free trade between nations to enhance economic efficiency and stimulate economic growth. Accumulating international evidence and experience supports the view that free market prices are a prerequisite of a well-functioning economy and sustained economic growth. However, the efficient allocation of resources requires not only market generated price incentives, but also the ability of resource owners to acquire and respond to market incentives.

The mobility of labor and capital may be impaired by the government, particularly in nations characterized by military regimes or entrenched despots who benefit from preservation of the status quo. People and assets may be less mobile under authoritarian governments for two reasons. First, if market information regarding the relative returns to resources is influenced by the government, resource mobility may be constrained, simply because the relative returns to factors of production are not known with accuracy. Second, given market conditions, the movement of resources between locations and occupations may be constrained by the government. A government may "tax" rural to urban migration by searching and seizing assets carried by migrants, or by encouraging jobless urban workers to return to rural areas. Resource mobility may also be limited by coercion.

Given these constraints, free market prices can be considered

necessary, but not sufficient conditions for the efficient allocation of resources and economic growth. Economies characterized by free markets may not perform well if political suppression of either market information or resource mobility is present. Previous studies on labor migration in developing nations have concentrated on the economic costs and returns to migration. While economic incentives have been confirmed to be important determinants of migration in general, and of rural to urban migration in particular, previous studies have not considered the potential impact of political institutions on rural to urban migration. The innovation of this study is to consider both economic and political aspects of labor migration.

The fundamental hypothesis considered here is that political institutions, and the freedoms extended under these institutions, have an impact on migration decisions. Political restrictions may result in a lack of complete information supplied to potential migrants concerning opportunities in other regions or occupations. Similarly, constraints on civil liberties may impose consequences on individuals who attempt to take advantage of economic opportunities by migrating. The outcome of these possibilities is the refutable hypothesis that economies characterized by greater political freedom and civil liberties experience greater levels of resource mobility in response to economic incentives. This hypothesis was stated in 1776 by Adam Smith in <u>The Wealth of Nations</u>:

> If in the same neighborhood, there was any employment evidently either more or less advantageous than the rest, so many people would crowd into it in the one case, and so many would desert it in the other, that its advantages would soon return to the level of other employments. This would at least be the case in a society where things were left to follow their natural course, where there was perfect liberty, and where every man was perfectly free to choose the occupation he thought proper, and to change it as often as he thought proper [Smith (1776 p. 201)].

The objective of this research is to identify and quantify the statistical relationships between political freedoms and the migration of labor out of agriculture in a cross section of 32 African nations over the period 1972 to 1987. Africa provides a particularly well-suited and important venue to test this hypothesis. Many African nations have been beset by dire poverty, poor economic performance, low productivity growth, huge increases in population, and increasing urbanization [Eicher (1984)]. Politically, the continent has been troubled with seemingly constant changes of governments, coups, riots, and repression [Turok (1987 p.1)]. Given the severity of the economic and political conditions that have characterized Africa, a deeper understanding of the relationships between political institutions and economic behavior is crucial. The incorporation of institutional variables into economic analyses clarifies our knowledge of what has taken place in the past, and enhances our ability to prescribe policies for the future.

The Migration of Labor Out of Agriculture

An enormous literature on labor migration has provided many insights into the determinants of the flow of persons between

locations and occupations. Perhaps the most obvious result of this literature is the enormity of the possible determinants of migration: "Migration of human beings is a complex personal, economic, social, demographic, psychological, and political process" [Graves and Clawson (1981 p. 364)]. The existing literature has been summarized by Greenwood (1975, 1985), and most recently by Greenwood et al. (1991).

The movement of individuals and families from rural to urban locations is one characteristic of economic development. As economic growth occurs, the agricultural sector becomes less prominent relative to the industrial sector. This is a result of the low income elasticity of demand for food: as per capita incomes increase, a diminishing share of economic resources, including labor, is devoted to the production of agricultural products. The literature concerning rural-to-urban migration has been reviewed by Graves and Clawson for the United States. Reviews of migration in developing countries include Yap (1977), Todaro (1976 and 1980), and Mazumdar (1987). These studies have provided details about the type of individual who is most likely to migrate: "...young, better educated than the average resident, and predominantly male in Africa..." [Yap (1977 p. 239)].

Econometric studies have confirmed that "people move for economic gain, from poorer areas to wealthier areas" [Yap (1987 p. 240)]. The response of labor to economic incentives forms the foundation upon which the present study is built; potential migrants base their decision to migrate on the benefits and costs

associated with a move to a new location or occupation. Previous studies have concentrated on the economic benefits of migration, in the form of anticipated earnings. This analysis retains the hypothesis that economic incentives form the primary determinant of migratory decisions, but asserts that the economic motivation to migrate is conditioned by political institutions. Specifically, the migratory response to given economic conditions is expected to be higher in nations with greater political freedoms and civil liberties.

Labor migration can be considered to be an investment in human capital [Sjaastad (1962)], where the investment undertaken is the change in location or occupation, and the returns to the investment are the enhanced earnings that accrue to the migrant once the move has taken place. Investments in human capital, including migration, are conditional on not only economic factors, but also political considerations. In Transforming Traditional Agriculture, T. W. Schultz illuminated this possibility:

> Some poor countries are still saddled with politically influential landowners. It should be expected that this group would oppose and delay public expenditure for schooling for the rank and file of farm people. Such schooling in their view could serve no useful purpose and could be harmful. It might become a disturbance weakening their political position [Schultz, T.W. (1964 p. 197)].

Given much previous evidence that "...migration and education are positively correlated," [Todaro (1976 p. 73)] a relationship between migration and political factors can be postulated. If politically powerful landlords have costs associated with a change in the status quo, the provision of education and market

information about opportunities outside of the traditional sector may be repressed.

In a review of the causes and consequences of urbanization in the developing world, Hamer and Linn (1987) noted other forms of government intervention that affect the incentive to migrate:

> Lack of adequate information and access to jobs, or alternatively, the often high cost of gaining information or of commuting have placed limits on the matching of labor demand and supply and have resulted in earnings differentials and in lower effective wage rates and earnings, especially for unskilled labor [Hamer and Linn (1987 p. 1273)].

Governments, in varying degrees, can influence the likelihood of migration by altering the economic incentives to migrate. Governments that are sufficiently powerful may also affect migration more directly, through coercion. According to T.W. Schultz,

> In countries where ideology dictates that the state must be the landlord and farm people must be strictly workers...the state proceeds to eliminate in principle all property rights... In extreme cases, large numbers of farmers have been literally liquidated, among them the most skilled in agriculture [Schultz, T.W. (1964 pp. 198-199)].

Many African nations have attempted to slow the rapid urbanization process through policies that deter migration by either "moral exhortation to return to the land" or more severe incentives such as "the adoption of forced controls on the movement of people" [Todaro (1971 p. 396)]. For example, Kenyan officials have at times asked urban migrants to seek opportunities in agriculture, and Tanzania institutionalized a policy of returning unemployed workers to the countryside or to some other rural location [Todaro (1971)]. Todaro emphasized the limited impact of

these policies on reducing the flow of migrants to urban areas, often due to substantial earnings differentials between rural and urban labor markets.

Although most previous studies of labor migration have not included the possibility of political institutions as a determinant of mobility, there are some studies that have considered the interaction between migration and nonwage variables. T. Paul Schultz (1971), in a study of rural to urban migration in Colombia, found that the level of violence affected the rate of migration between regions.

Todaro (1969) derived a mathematical model of rural to urban migration that considered the probability of being employed in the modern sector as a determinant of migration. In later work, Todaro (1971) considered the explicit role of government policies such as import substitution or legislated attempts to increase employment as determinants of migratory behavior in Africa. Todaro (1971 p. 413) concluded, "Clearly, more needs to be known about the empirical value of [the migration response function] in different African nations...".

A more recent study by Mbaku (1988) explored the relationship between political institutions and economic development. Mbaku (1988) concluded that political instability has contributed significantly to economic stagnation in the context of Africa. A recent contribution by Rodgers (1991) incorporated institutional variables into a standard economic model of migration in Kenya. Specifically, Rodgers (1991) included variables that measured

Kenya's planned resettlement schemes into a migration function previously estimated by House and Rempel (1980). Rodgers (1991 p. 924) concluded that "...resettlement schemes located in destination provinces attracted migrants." The present analysis extends previous literature by the explicit consideration of political institutions, as measured by political rights and civil liberties, into a migration equation.

Measurements of Political Rights and Civil Liberties

In spite of overwhelming evidence that property rights and political institutions are important determinants of economic performance, economists have only recently incorporated political variables into empirical models of economic development. In part, this has been due to a lack of measurements which are comparable across countries. One source of comparable data on freedoms is the Freedom House. Annual ratings of political rights and civil liberties are summarized in Freedom House (1989).

Political and civil liberties are rated annually by Freedom House using a scale of one (representing the highest degree of liberty) to seven (representing the lowest degree of liberty). These ratings are constructed by averaging a checklist of characteristics of a nation's political rights and civil liberties (seven for political rights and thirteen for civil liberties). Each item in the list is given a score of zero, one or two, based on a set of procedures that is standard across countries and years. The raw scores are averaged and represented on a seven point scale.

Political rights, as defined by Freedom House (1989), are those rights that enable individuals to participate freely in the political process. A political system is considered to be genuinely free or democratic to the extent that people have a choice in determining the nature of the system and its leaders. The definition of political freedoms also includes an individuals' freedom from domination by military, foreign powers, totalitarian parties, religious hierarchies, economic oligarchies, or any other powerful group.

Civil liberties are considered to be the freedoms that develop views, institutions and personal autonomy apart from the state. The ranking of civil liberties includes a requirement for free and independent media, literature and other cultural expressions. Also included are rights to have open public discussion and freedom of assembly and demonstration. Measures of civil liberties (CL=1,2,...,7) and political rights (PR=1,2,...,7) are incorporated into the analysis of migration out of agriculture in Africa that follows. Further descriptions and details of the features of the freedom scores can be found in Freedom House (1989).

Scully (1988) utilized these ratings in a model of economic growth. The results of his study presented evidence that politically open societies attained higher rates of economic growth than politically closed nations during the period 1960 to 1980.

Theoretical Model

We now turn to the development of a theoretical framework that incorporates institutional characteristics into an individual's decision to migrate. Following Sjaastad (1962), migratory behavior is analyzed using a model of occupational choice that considers migration to be an investment in human capital. The economy is composed of two sectors: agriculture (a) and nonagriculture (n), as in Mundlak (1979). Migration in year t is defined to be occupational migration between agricultural employment (L_{at}) and nonfarm employment (L_{nt}). Total employment (L_t) is the sum of farm and nonfarm workers.

$$L_t = L_{at} + L_{nt} \tag{1}$$

Changes in the sectoral labor force occur for two reasons. First, through additions to the labor force, determined by population growth rates in each sector (λ_a and λ_n), and second, through the migration of labor between sectors (M_t). Migration is defined to be positive when workers transfer out of agriculture.

$$L_{a(t+1)} = (1 + \lambda_a) L_{at} - M_t \tag{2}$$

$$L_{n(t+1)} = (1 + \lambda_n) L_{nt} + M_t \tag{3}$$

Consider an individual s, currently employed in agriculture, who faces employment possibilities in both the farm and nonfarm sectors. Occupational decisions are assumed to be made by comparing the discounted utility derived from each occupation over the individual's career, where t=0 is the date of occupational

choice, and t=T is the retirement date.

The net utility (NU_{st}) of individual s at time t is assumed to be a function of the expected annual earnings from working in agriculture in year t (y^*_{at}), where the asterisk represents expectations. Occupational choice is characterized by the comparison of the discounted utility derived from expected earnings in agriculture (y^*_{at}) and nonagriculture (y^*_{nt}) over the remaining career of the individual, or maximization of the net utility function in equation (4), where r is the discount rate.

$$NU_{st} = \int_0^T U(y^*_{at})\, e^{-rt} dt - \int_0^T U(y^*_{nt} - c_{ant})\, e^{-rt} dt \qquad (4)$$

Migration is not costless; transactions costs and nonpecuniary, or psychic, costs are included in the term c_{ant}, which represents the costs of moving from agriculture to the nonfarm sector in year t. Migration is expected to occur when net utility derived from the nonfarm occupation over the entire career exceeds the career utility derived from the agricultural occupation net of moving costs, or when net utility is negative.

By summing the discounted annual earnings from t=0 to t=T, career earnings can be calculated, and are represented by Y^*_{at} and Y^*_{nt}. Annual migration costs are also summed to form career costs C_{ant}, and the net utility function can be restated as in equation (5).

$$NU_{st} = U(Y^*_{at}) - U(Y^*_{nt} - C_{ant}) \qquad (5)$$

Occupational migration of individual s occurs when net utility

is negative ($NU_{st} < 0$). To aggregate all individual decisions in year t, an index function (I_{st}) is defined in equation (6) to distinguish migrants from nonmigrants.

$$I_{st} = \begin{cases} 1 \text{ if } NU_{st} < 0 & (\textit{migration occurs}) \\ 0 \text{ if } NU_{st} \geq 0 & (\textit{migration does not occur}) \end{cases} \qquad (6)$$

The magnitude of gross migration from agriculture to the nonfarm sector in year t (M_{ant}) is the sum of the index function I_{st} over all s=1,...S individuals originally employed in agriculture, as in (7).

$$M_{ant} = \sum_{s=1}^{S} I_{st} \qquad (7)$$

Some persons may flow from occupation n to occupation a, so the level of net migration is $M_t = M_{ant} - M_{nat}$. The rate of net migration out of agriculture is given by the net migration divided by the size of the agricultural labor force, as in equation (8).

$$m_t = \frac{M_t}{L_{at}} \qquad (8)$$

Given these considerations, the rate of net migration is modeled as a function of expected lifetime earnings in agriculture and nonagriculture, as well as the costs of migration.

$$m_t = f(Y^*_{at},\ Y^*_{nt},\ C_{ant}) \qquad (9)$$

Following previous migration literature of Mundlak (1979) and Barkley (1990), migration is considered to be a function of the ratio of expected labor returns in each sector. To simplify, define P as the actual earnings ratio, agriculture to

nonagriculture.

$$P_t = \frac{Y_{at}}{Y_{nt}} \tag{10}$$

The larger the divergence between farm and nonfarm returns, the more individuals will find that the difference in earnings justifies migration [Mundlak (1979)]. Because migrants make decisions based on the expected value of relative returns, we must relate expected earnings to actual earnings, as in equation (11). The influence of political institutions on the ratio of labor returns occurs through the variable γ_t, which is a measure of political freedom. In the case of complete political freedom, and perfect information concerning nonfarm earnings, $\gamma_t = 1$, resulting

$$P_t^* = \frac{Y_{at}^*}{Y_{nt}^*} = \frac{Y_{at}}{Y_{nt}}\gamma_t = P_t\gamma_t \tag{11}$$

in $P^*_t = P_t$. However, when political or civil freedoms are lacking, information about relative returns may also be incomplete. In these cases, γ_t will not equal unity, resulting in the divergence of P^*_t from the actual ratio of labor returns, P_t.

Given these considerations, we assert a direct relationship between institutional characteristics (γ_t) and the expected returns ratio (P^*_t). If a government suppresses the basic liberties which must be present in order for individuals to react to economic incentives, then this lack of political freedom may result in a decreased rate of labor migration out of agriculture. The rate of

migration in year t is specified to be a function of the expected returns ratio, P^*_t, and a vector of exogenous variables, X_t.

$$m_t = f[P^*_t(\gamma_t) ; X_t] \qquad (12)$$

This study focuses on the response of the migration rate to the actual returns ratio, P, and the degree of political freedom, γ_t. The expected directions of change can be found by differentiating the migration equation (12) with respect to the independent variables P and γ.

$$\frac{\partial m}{\partial P} = \frac{\partial m}{\partial P^*}\frac{\partial P^*}{\partial P} = \frac{\partial m}{\partial P^*}\gamma_t \qquad (13)$$

The derivative in equation (13) is expected to be negative because higher agricultural earnings relative to expected nonfarm earnings induce lower rates of migration. The impact of an increase in political freedom can be found by taking the derivative of the migration equation (12) with respect to the degree of political freedom, γ.

$$\frac{\partial m}{\partial \gamma} = \frac{\partial m}{\partial P^*}\frac{\partial P^*}{\partial \gamma} \qquad (14)$$

This derivative represents the effect that the level of political freedom (γ_t) has on the expected earnings ratio that potential migrants actually face, including the possibility that political factors may alter the expectations of the returns to migration.

The most direct model relating institutional and economic variables is a linear model with variable slopes:

$$m_{it} = \alpha_{it} + \sum_{j=1}^{7} \beta_j Z_{ijt} P_{it} + \delta X_{it} \qquad (15)$$

where m_{it} is the sectoral migration rate in country i in year t, P_{it} is the labor returns ratio, agricultural to nonfarm, the Z_{ijt} are qualitative variable transformations of Freedom House ratings of civil liberties and political rights (Z_{ijt} = 1 if CL=j, 0 if CL≠j). The groups CL=1 and PR=1 were omitted from the analysis, due to zero observations in each of these two categories. A vector of exogenous variables (X_{it}) were also expected to affect migration. Exogenous variables were selected based on the earlier work of Mundlak (1979): the level of per capita GDP and the percentage of population in the agricultural sector.

This specification allows for the possibility of different effects of economic incentives in different institutional environments through the interaction of institutional qualitative variables and the labor returns ratio. The important statistical tests of the paper focus on the equality of the estimated β_j from equation (15). If the null hypothesis that all β_j are equal can be rejected, then the regressions provide evidence that political and civil freedoms are important factors which condition the response of migration to economic incentives. Since we anticipate the political and civil liberties aid, rather than hinder, the response to economic incentives, we expect the magnitude of the estimated β_j to be larger in nations and years of greater freedoms: $\beta_2 > \beta_3 > \ldots > \beta_7$.

Data

The definition of intersectoral migration in equation (2) requires a measure of the growth rate of the agricultural labor force (λ_a). Sectoral population growth rates are unavailable for African countries, but overall population growth rates are available.[1] One assumption that could be made to get around the lack of data is equal population growth rates in both agriculture and nonagriculture. However, Kuznets (1966) suggested that agricultural population growth rates are much larger than nonfarm growth rates, and the ratio may roughly three to one ($\lambda_a = 3\lambda_n$). Following Mundlak (1979), we utilize the Kuznets assumption of the three to one ratio. Define λ to be the overall population growth rate, and sector shares of population to be $l_a = L_a/L$ and $l_n = L_n/L$. Then, using the assumption that $\lambda_a = 3\lambda_n$, and $\lambda = l_a\lambda_a + l_n\lambda_n$, the Kuznets assumption leads to equation (16).

$$\lambda_a = \frac{\lambda}{l_a + \frac{1}{3}l_n} \qquad (16)$$

Equation (16) is substituted into equation (2), yielding a method for the calculation of the rate of migration, m_t.

Annual migration figures were estimated using data from The World Bank's World Tables (1991). The percentage of the labor force employed in agriculture (l_{at}), needed to calculate the sectoral migration rates, is available only for the period 1972 to

---

[1]In a two-sector economy, the national population growth rate is defined as $\lambda = l_a\lambda_a + (1-l_a)\lambda_n$, where l_a is the percentage of the population employed in the agricultural (a) sector ($l_a = L_a/L$).

1980. A related data series, however, is the percentage of the population living in urban areas (URB_t), which is available for the entire period, 1972 to 1987. This series was used to extend the labor force series through 1987.

The agricultural percentage of the labor force (l_{at}) was regressed as in equation (17) on the urban percentage of the population (URB_t) for the years 1969 through 1980 for each of the 32 countries listed in Table 1.

$$l_{ait} = \alpha_{it} + \beta_i URB_{it} + e_{it} \qquad (17)$$

Using the parameters estimated in equation (17), a new series was created (l^*_{at}) which covers the period 1969 to 1987.

$$l^*_{ait} = \alpha_{it} + \beta_i URB_{it} \qquad (18)$$

Regression results (not reported here, but available from the authors upon request) indicate a relatively good fit, with an R^2 of over 0.99 in 25 of the 32 countries. One problem with the data is Algeria's large estimated slope, which when extrapolated into the 1980-1987 period results in only nine percent of the labor force engaged in agriculture in 1987, compared with 31 percent engaged in agriculture in 1980. Since this in unrealistic, we substituted Egypt's estimated slope for Algeria, and adjusted the intercept so that the estimates match the actual data in 1975.

The percent agricultural labor force series, when multiplied by country population estimates and combined with annual population growth rates, yielded a sectoral labor force series used to estimate the sectoral migration rate out of agriculture (m_{it}), which

is summarized in table 1. Migration rate estimates range from a low annual average of 0.2% for Burundi to a high of 9.87% for Libya.

Following previous migration literature, the returns to labor in each sector of the economy are measured by the average product of labor in agriculture and nonagriculture. The ratio of labor returns, farm to nonfarm, is used as a measure of relative labor returns. Data on the sectoral average products in African countries come from the World Bank publication, African Economic and Financial Data. The returns to labor in each sector were estimated by the value added in each sector, divided by the previously estimated sectoral labor forces. This measure of average products for each sector is also reported in table 1.

The average product of labor in agriculture is lowest in the poorest countries: Burkino-Faso, Ethiopia, Lesotho, and Malawi. Average products in the nonfarm sector are highest in countries that have either diamond deposits, such as Botswana, or oil reserves, such as Algeria, Libya, and Nigeria. The ratio of average products (also reported in table 1) is generally less than one, although it is close to unity for Ghana.

Results

The pooled (cross section and time series) migration equation (15) was estimated separately for the measure of civil liberties (CL), reported in table 2, and the measure of political rights (PR) reported in table 3. The estimated coefficients and probability

values were computed using White's correction for heteroskedasticity [White (1980)]. Tables 2 and 3 also report tests that restrict coefficients across freedom house ratings. The first test restricts coefficients across all freedom house rating groups. Next, groups were tested sequentially, beginning with the most free rating, to determine whether each group's coefficient on migration is statistically different from the adjacent (more restrictive) group. If this test is not rejected, then the two groups were combined, and the next adjacent group was tested for divergence from the composite group, else it was assumed that the more free group represents a group different than the others. The bottom block in the tables reports regression results of the restricted regressions, imposing the restrictions found in the sequential test procedure.

Table 2 reports results measuring the response of the migration rate to the labor returns ratio in different environments of civil liberties. The response was of the expected negative sign (a lower average product in agriculture, relative to the nonagricultural average product, induces more labor migration out of agriculture), and was significant in all but the two most restrictive civil liberties environments. Nations with higher per capita incomes and lower absolute levels of farm employment were associated with higher rates of migration out of agriculture, as is consistent with previous literature. In general, the elasticity of migration with respect to the labor returns ratio was larger in situations where greater degrees of civil liberties prevail. The

elasticity of migration with respect to relative labor returns in the most free countries (CL = 2) equalled -1.04, which exceeded the response in nations where civil liberties are more constrained.

An F-test rejected the hypothesis that responses were similar across all civil liberty ratings at a high level of statistical significance. Sequential tests of restrictions across civil liberty ratings indicated that groups two, three, and four were not statistically different, but that groups five and six were statistically divergent from nations of greater civil liberties.

The bottom block in table 2 reports regression results with three aggregated groups which resulted from the restrictions imposed by the sequential testing procedure. These results confirm the hypothesis that the migration response to the labor returns ratio is greater in environments of greater civil liberties. When qualitative institutional variables [Z_{ijt}] were added to the model as independent variables, their estimated coefficients were insignificant, suggesting that the absence of direct relationship between civil liberties and the rate of labor migration out of agriculture in Africa.

An alternative measure of freedom is the Freedom House (1989) measure of political rights. Table 3 reports regression results using political rights as the institutional variable. Results in table 3 are similar to those for civil liberties, although there are some differences. Most importantly, nations with greater political rights also experienced the strongest migration response to labor market conditions. While in the case of civil liberties

this result was monotonic across the ratings, for political rights there appears to be a gap. In the restricted regression results, the most free countries (PR=2) had the largest elasticity, equal to -0.62. Observations with political rights ratings of three and four had an insignificant migration response to the average product ratio, whereas for the group of nations where political rights equalled five, the elasticity was significant and smaller than in the most free group. As anticipated, nations with low levels of political rights (PR=6, PR=7) had the smallest elasticity of migration with respect to the labor returns ratio.

Sensitivity Analysis

Aggregate economic statistics from African nations likely contain measurement errors. A comparison of the between, within, and weighted regressions allows for analysis of the incidence and effect of possible errors in measurement in the statistical results of the pooled regressions reported above. As a final diagnostic, reversed regressions were estimated to place bounds on the coefficients under various assumptions of measurement errors.

The between estimator isolates variance between nations, and is calculated as the following transformation of equation (15):

$$\frac{1}{T}\sum_t m_{it} = \alpha_i + \sum_j \beta_j Z_{ijt}\frac{1}{T}\sum_t P_{it} + \delta\frac{1}{T}\sum_t X_{it} \qquad (19)$$

Due to limited variation in institutional variables when averaged across time, institutional variables were aggregated into two categories, based on the statistical tests for restrictions

developed in tables 2 and 3. In the between, within, and weighted regressions, the sample was divided into groups of "free" nations (CL=2,3,4; PR=2,3,4) and "not free" observations (CL=5,6,7; PR=5,6,7). Elasticities and probability values of this estimator are reported in the first two columns of table 4. The within estimator isolates variance between time periods, and is calculated as:

$$m_{it} = \alpha_t + \sum_j \beta_j Z_{ijt} P_{it} + \delta X_{it} + \sum_i \phi_i \Delta_{it} \qquad (20)$$

where Δ_{it} is a qualitative variable equal to one in country i, and zero otherwise. Elasticities and probability values of this estimator are reported in the middle two columns of table 4.

The weighted estimator uses additional information available to weight more heavily years which are closer to census years in the included African nations, because data closer to census years are less likely to contain errors of measurement. The weighted regression applies weighted least squares, rather than ordinary least squares, to equation (15), using as weights $1/(1+C_t)$, where C_t is the number of years from a census year. The variable C_t ranges from 0 (in a census year) to 17 (for Chad, which did not conduct a census during the period of the study). Elasticities and probability values of the weighted estimation are also found in the last two columns of table 4.

Table 4 indicates that the results of the between and pooled regression results were similar, while the within estimator produced quite different results. In fact, the within coefficients

were not of the expected sign, and the per capita GDP lacked statistical significance. The pooled regression coefficients may be written as a weighted average of the between and within regression coefficients. The closeness of the pooled coefficients reported in tables 2 and 3 to the between coefficients of table 4 indicates that the main source of variance in the sample comes across countries, rather than across time. Also, it is well known that the within estimator amplifies errors in measurement. Given the possibility of measurement error, we employ a technique to gauge the sensitivity of the estimators to errors in measurement: reversed regressions [Klepper and Leamer (1984)].

Table 5 reports the results of the reversed regressions. Since the estimated coefficients for CL=2,3,4 changes sign (is negative for minimization in all directions, except for per capita GDP), this coefficient can not be bounded without additional information. That is, errors in measurement can potentially account for the result that the effect of the average product ratio on migration is similar for countries with either free (CL=2,3,4) or not free (CL=5,6,7). If the assumption is made that per capita GDP is measured without error, then the effect of the average product ratios on migration in nations with free civil liberties can be differentiated from the effect in countries without free civil liberties.

Klepper and Leamer (1984) suggest calculating bounds for the estimated coefficients, to test the magnitude of measurement error that would be required to overturn the estimation results of

equation (15). The R-square of the base regression was 0.75. The calculations of coefficient bounds demonstrated that unless the removal of all measurement error increased this R-square to 0.92 or higher, the estimated coefficient on the labor returns ratio for civil liberties equal to two, three, or four (CL=2,3,4) is bounded away from zero. This suggests that measurement errors must account for a significant portion of the unexplained variance in the regression before the results can be overturned. Moreover, measurement errors are more likely to increase (in absolute value) the size of the effect than to decrease it towards zero. This diagnostic suggests that while measurement error is likely to be present in the regressions, it is not likely that its presence can overturn the empirical results.

Conclusions

The theoretical notion that free market prices provide signals which guide the efficient use of resources has achieved strong and growing empirical support. However, there have been few investigations into the relationship between political institutions and the ability of individuals to act on the information provided be market prices. This research has provided a first step towards an enhanced understanding of the link between economic signals and institutional constraints. The migration out of agriculture in a cross section of 32 African nations was shown to be responsive to market signals that reflect the relative returns to labor.

Regression results indicated that the effect of price signals

on labor migration was conditional on the degree of political rights and civil liberties: higher levels of political freedom resulted in greater rates of migration from agriculture to the nonfarm sector, given the prevailing market conditions. The major implication for policy makers is that policies that are directed at correcting price signals alone may not be as successful as policies that also address institutional issues. Stated differently, policies that correct price signals will be more effective in environments where there are greater political and civil freedoms.

Given the severity of the economic and political problems in Africa, this conclusion is timely and important. In a continent besieged by low productivity, high rates of population growth, and overwhelming political instability, a strengthened base of knowledge allows for an increased understanding of what has occurred in the past, as well as a foundation upon which to build policies for the future.

Acknowledgements

The authors wish to gratefully acknowledge the helpful comments of Yair Mundlak, William Carrington, and the participants of seminars at the University of Chicago, the African Bureau of the U.S. Agency for International Development, and the selected paper session at the American Agricultural Economics Association's 1992 Annual Meetings in Baltimore, Maryland.

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Table 1. Data Employed in Migration Study: Annual Averages, 1972-1987.

Country	Mig. Rate	Ag Average Product	Nonag Average Product	Average Product Ratio	Polit. Rights	Civil Libs.
	--(%)--	---(1980 U.S. $)--				
Algeria	3.94	463	2826	0.1638	6.1	6.0
Benin	2.38	192	573	0.3349	7.0	6.4
Botswana	3.24	152	2932	0.0517	2.1	3.1
Burkino-Faso	0.43	91	760	0.1202	5.3	4.6
Burundi	0.20	142	1009	0.1404	6.9	6.3
Cameroon	2.79	331	1855	0.1787	6.1	5.4
Cent. Afr. Rep.	2.05	182	761	0.2398	6.9	6.3
Chad	1.02	106	702	0.1507	6.6	6.5
Cote D'Ivoire	2.90	481	1998	0.2410	5.8	5.2
Egypt	3.15	238	715	0.3325	5.1	4.7
Ethiopia	1.12	61	245	0.2508	6.6	6.6
Gambia	0.70	132	1422	0.0926	2.4	2.8
Ghana	1.58	400	420	0.9514	5.9	5.0
Guinea-Bissau	0.61	115	396	0.2911	6.1	6.1
Kenya	1.03	149	1287	0.1159	5.3	4.7
Lesotho	0.74	82	1110	0.0741	5.1	4.6
Libya	9.87	873	14248	0.0613	6.4	6.2
Malawi	1.36	75	641	0.1171	6.4	6.6
Mali	0.54	152	745	0.2035	7.0	6.3
Mauritania	3.21	198	979	0.2019	6.4	6.0
Mauritius	1.12	599	1272	0.4709	2.2	2.4
Morocco	4.18	344	1313	0.2619	4.2	4.6
Niger	0.55	221	2202	0.1005	6.9	6.0
Nigeria	1.16	441	2377	0.1855	4.8	3.9
Senegal	0.77	144	2194	0.0656	4.4	4.1
Sierra Leone	1.48	140	712	0.1969	5.2	5.0
Somalia	1.03	213	595	0.3572	7.0	6.8
Sudan	1.24	169	704	0.2399	5.4	5.5
Togo	1.15	150	1012	0.1482	6.8	5.9
Tunisia	3.00	546	1449	0.3766	5.6	5.1
Zambia	1.15	141	2201	0.0640	5.0	5.2
Zimbabwe	1.32	147	2402	0.0612	4.7	5.1

Table 2. African Migration Regression Results: Civil Liberties.

I. Unrestricted Regression Results

Dependent variable: Migration rate out of Agriculture, 1972-1987.

Independent Variable	Mean	Estimated Coefficient	Prob=0	Elasticity
Constant	--	0.05059	0.0001	--
AP Ratio¦CL=2	0.3499	-0.03093	0.0188	-1.0407
AP Ratio¦CL=3	0.1577	-0.01308	0.0149	-0.0991
AP Ratio¦CL=4	0.1933	-0.01804	0.0050	-0.2456
AP Ratio¦CL=5	0.2282	-0.00617	0.1077	-0.0737
AP Ratio¦CL=6	0.3025	0.00182	0.5872	0.0253
AP Ratio¦CL=7	0.2384	0.00452	0.2609	0.0637
Per Capita GDP	0.8493	0.00537	0.0001	0.2403
Labor Force % Ag	0.6799	-0.05092	0.0001	-1.8255
R-square		0.7499		
No. of Observations		505		

II. Coefficient Restriction Tests

Null Hypothesis:	F-Statistic	Probability
CL=2=3=4=5=6=7	5.5496	0.0001
CL=2=3	1.6229	0.2033
CL=2=3=4	0.8387	0.4329
CL=2=3=4=5	2.3951	0.0675
CL=5=6	5.3292	0.0214

III. Restricted Regression Results

Dependent variable: Migration rate out of Agriculture.

Independent Variable	Mean	Estimated Coefficient	Prob=0	Elasticity
Constant	--	0.04941	0.0001	--
AP Ratio¦CL=2,3,4	0.2177	-0.02134	0.0001	-0.3017
AP Ratio¦CL=5	0.2282	-0.00570	0.1423	-0.0681
AP Ratio¦CL=6,7	0.2199	0.00244	0.4387	0.0262
Per Capita GDP	0.8439	0.00545	0.0001	0.2425
Labor Force % Ag	0.6799	-0.04929	0.0001	-1.7671
R-square		0.7459		
No. of Observations		505		

Table 3. African Migration Regression Results: Political Rights.

I. Unrestricted Regression Results

Dependent variable: Migration rate out of Agriculture, 1972-1987.

Independent Variable	Mean	Estimated Coefficient	Prob=0	Elasticity
Constant	--	0.05099	0.0001	--
AP Ratio¦PR=2	0.2189	-0.04447	0.0060	-0.6240
AP Ratio¦PR=3	0.2184	-0.00317	0.4758	-0.0420
AP Ratio¦PR=4	0.2070	0.00840	0.5425	0.0674
AP Ratio¦PR=5	0.1696	-0.01493	0.0814	-0.1613
AP Ratio¦PR=6	0.2456	-0.00491	0.2973	-0.0515
AP Ratio¦PR=7	0.3312	-0.00136	0.6962	-0.0272
Per Capita GDP	0.8493	0.00538	0.0001	0.2408
Labor Force % Ag	0.6799	-0.05060	0.0001	-1.8140

R-square	0.7708
No. of Observations	505

II. Coefficient Restriction Tests

Null Hypothesis:	F-Statistic	Probability
PR=2=3=4=5=6=7	2.5623	0.0265
PR=2=3	8.4270	0.0039
PR=3=4	0.9229	0.3372
PR=3=4=5	2.9583	0.0528
PR=5=6	2.8466	0.0922
PR=6=7	1.1832	0.2772

III. Restricted Regression Results

Dependent variable: Migration rate out of Agriculture, 1972-1987.

Independent Variable	Mean	Estimated Coefficient	Prob=0	Elasticity
Constant	--	0.05080	0.0001	--
AP Ratio¦PR=2	0.2189	-0.04438	0.0052	-0.6228
AP Ratio¦PR=3,4	0.2121	0.00165	0.7820	0.0162
AP Ratio¦PR=5	0.1697	-0.01491	0.0637	-0.1612
AP Ratio¦PR=6,7	0.2887	-0.00297	0.3929	-0.0713
Per Capita GDP	0.8439	0.00537	0.0001	0.2388
Labor Force % Ag	0.6799	-0.05033	0.0001	-1.8043

R-square	0.7692
No. of Observations	505

Table 4. African Migration Regression Results: Between, Within, and Weighted.

I. Civil Liberties Regression Results

Dependent variable: Migration rate out of Agriculture, 1972-1987.

	"Between" Regression		"Within" Regression		"Weighted" Regression	
Independent Variable	Elas.	Prob=0	Elas.	Prob=0	Elas.	Prob=0
AP Ratio¦CL=2,3,4	-0.44560	0.0346	0.41951	0.0001	-0.24031	0.0001
AP Ratio¦CL=5,6,7	-0.17301	0.1085	0.29954	0.0001	-0.01993	0.5247
Per Capita GDP	-0.61920	0.0005	-3.49934	0.0001	-1.87497	0.0001
Labor Force % Ag	0.59026	0.0013	-0.00077	0.9860	0.23984	0.0001
R-square	0.8515		0.9415		0.7381	
No. of Observations	32		505		505	

II. Political Rights Regression Results

Dependent variable: Migration rate out of Agriculture, 1972-1987.

	"Between" Regression		"Within" Regression		"Weighted" Regression	
Independent Variable	Elas.	Prob=0	Elas.	Prob=0	Elas.	Prob=0
AP Ratio¦PR=2,3,4	-0.50852	0.0414	0.43725	0.0001	-0.23360	0.0001
AP Ratio¦PR=5,6,7	-0.17030	0.2726	0.25836	0.0001	-0.02130	0.4678
Per Capita GDP	-0.63390	0.0009	-0.34872	0.0001	-1.85848	0.0001
Labor Force % Ag	0.59415	0.0065	-0.00286	0.9485	0.24296	0.0001
R-square	0.8671		0.9419		0.7313	
No. of Observations	32		505		505	

Table 5. African Migration Reversed Regression Results.

Independent Variable	Direction of Minimization: Migration Rate	AP Ratio CL=2,3,4	AP Ratio CL=5	Labor Per. Ag	Per Cap. GDP
AP Ratio¦CL=2,3,4	-0.02257	-0.58447	-0.27000	-0.07262	0.01165
AP Ratio¦CL=5	-0.00711	-0.85096	-0.49079	-0.05595	0.02749
Labor Force % Ag	-0.00050	-0.01616	-0.00395	-0.00021	0.00023
Per Capita GDP	0.00001	-0.00003	-0.00002	-0.00001	0.00002
R-square	0.7456	0.3019	0.2277	0.6969	0.6345
No. of Observations	505				