CAPITAL MARKET IMPERFECTIONS, LABOR MARKET DISEQUILIBRIUM AND MIGRATION A THEORETICAL AND EMPIRICAL ANALYSIS

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Traditional analyses of the determinants of migration in less developed countries have focused on labor market conditions This paper adapts a simple model to show that capital market conditions may be an important factor in individuals' migration decisions Data from Ecuador are used to test this model, and the empirical results confirm the role of capital market imperfections---chiefly caused by financial repression—in shaping migration flows Traditional labor market factors still matter, but the new finding may provide policy makers with new and lower-cost tools with which to affect migration outcomes

I INTRODUCTION

In a thoughtful and pioneering work, Katz and Stark [1986] suggest that capital market imperfections may be an important cause of migration in less developed countries Their model is important because it provides an alternative to the host of migration models which focus exclusively on labor market conditions [1]

Consider for the moment an agricultural region of a less developed country that is undergoing rapid technological change To avail themselves of this change in agricultural technology, individuals must possess some minimum amount of financial capital to invest If capital markets were perfect, any individual could obtain financing provided that the potential project had an internal rate of return greater than the interest rate If, on the other hand, some minimum asset value is required to enter capital markets, individuals whose asset value is below this level may migrate out of the region, for reasons which are more fully discussed below [2] Thus, Katz and Stark predict strong migration outflows from regions with a high marginal product of capital and a significant absence of (or imperfection in) capital markets

In a general equilibrium framework, of course, disequilibrium in one market must

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1 The list of such models is almost endless, including the expected wage maximization genre (Todaro [1969], Harris-Todaro [1970] and their numerous descendants—see, for example, Blomqvist [1979], Shukla and Stark [1990], Corden and Findlay [1975] and Djajic [1985] among others), life cycle models (Polachek and Horvath [1988]), queuing models (Sabot [1979]), frontier earnings approaches (Herzog, Hofler and Schlottmann [1985]) to extended gravity models (Foot and Milne [1984], and rent-seeking models of migration (Becker and Morrison [1993]), this is far from an all-inclusive list

2 Rapid technological change may accentuate the need for access to credit markets, but lack of access to credit markets may stimulate outmigration even in the absence of such technological change Farmers excluded from seasonal credit (to buy seeds, fertilizer and other productive inputs) may not have the auto-financing capability necessary to remain pastoralists

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be reflected by disequilibrium in some other market So the labor market may be in disequilibrium as well, but the fundamental cause may be capital market imperfections Capital market imperfections may keep wages low (by limiting the amount of capital per worker and hence the marginal product of labor), which is then mistakenly interpreted in a migration model as corroboration of the Todaro hypothesis In a sense, perhaps the Todaro model is correct low origin wages—in comparison to the expected wage in the destination—are driving outmigration But in a more fundamental sense capital market imperfections are causing the outmigration

Katz and Stark derive an interesting and important conclusion from their model, viz

> If a main cause of rural to urban migration--a labor market phenomenon—is capital market imperfections, then a policy to constrain migration should aim at enhancing access to, and improving the competitiveness of, capital markets [and shift away from exclusive attempts to reduce rural-urban wage differentials] (p 137)

But to get to the policy conclusion, one must first deal with the thorny issue of observational equivalence Are low origin wages due to labor or capital market conditions? This essay is an attempt to empirically disentangle the two, using empirical evidence from Ecuador

I will proceed as follows First, I briefly describe imperfections in Ecuadorian capital markets which might lead to out-migration from rural areas, and summarize recent changes in Ecuadorian agriculture which may have intensified the impact of capital market imperfections on migration The combination of these factors may provide the conditions necessary for the Katz-Stark hypothesis, i e , that imperfect capital markets limit individuals' ability to take advantage of changed agriculture structure and technology, and that outmigration results The next section formally presents the competing hypotheses—labor market vs capital market explanations for internal migration—and derives estimating equations The final section attempts to distinguish between the two hypotheses and outlines some important policy conclusions

II CAPITAL MARKET STRUCTURE AND TECHNOLOGICAL CHANGE IN ECUADORIAN AGRICULTURE ADIOS SMALLHOLDERS?

Agricultural credit policy in Ecuador was heavily influenced by the "easy money" of the 1970s and early 1980s As an oil exporter, Ecuador benefited enormously from the two oil shocks, the central bank was flush with new-found foreign exchange from oil revenues and external borrowing, and much of this windfall was recycled into the domestic economy in the form of sectoral credit at negative real interest rates [3] The agricultural sector was a prime beneficiary of this largesse The chief government agency charged with extending loans to the agricultural sector was the National Development Bank (Banco Nacional de Fomento, BNF), which provided 36 percent of all credit to agriculture in the 1980s The ex post real interest rate on these loans during 1980–1988 ranged from a "high" of –1 percent (1980) to a low of –33 percent (1983), with a mean value of –11 2 percent [4]

With such highly negative real interest rates, the National Development Bank opted for non-price methods of rationing credit, including increased collateral requirements, more onerous application procedures and delays in loan disburse-

3 Nor was this situation unique to oil-exporting countries Negative real interest rates were quite common in less developed countries during the 1970s and 1980s, as work by Adams [1984] and McKinnon [1989] demonstrates

4 Ramos and Robison [1990, 315 and 322]

ment[5] These factors increased the fixed cost associated with each loan application, thus discouraging farmers from seeking small amounts of credit[6] On the supply side, the Bank had a strong incentive to reduce the costs of lending, since the institution was increasingly strapped for funds Before 1980, public institutions such as municipalities and provincial councils kept their deposits at the National Development Bank After 1980, however, these institutions were required to gradually transfer their accounts to the central bank[7] One way for the Development Bank to reduce the cost of lending was to grant fewer (but larger) loans, thus reducing transaction costs The combination of demand- and supply-side effects tended to skew the allocation of credit toward larger loans Thus, it is far from surprising to discover that the size distribution of Development Bank loans changed significantly during the 1980s While small loans represented 29 percent of all loans in 1980, they were only 2 percent of all Development Bank loans in 1988[8]

While the National Development Bank is the largest supplier of credit to the agricultural sector, there are other sources For private commercial banks to be eligible for low-interest central bank loans, they must place at least 10 percent of the value of their loan portfolio in agricultural loans Commercial banks have preferred to make a few very large agricultural loans—with consequent large collateral requirements—in order to minimize transactions costs[9] Another possible source of credit is the informal credit market A 1989 survey revealed that the mean real interest rate in informal credit markets was 138 percent, with a median maturity of less than two months[10] In sum, alternative sources of credit are either targeted to large agricultural enterprises or are quite expensive The overall picture, then, is of an imperfect capital market Subsidized credit is available to a select subset of (mostly large) farmers, while the majority of farmers with small land holdings (henceforth "smallholders") are either excluded completely from credit or must pay higher real interest rates in order to secure it[11]

The introduction suggested that the effect of imperfect capital markets on smallholders may be accentuated by technological change in agriculture which requires new capital investment It is not possible to document the extent and nature of technological change in all branches of

5 Application forms were both more numerous and lengthier Farmers were required to produce a deed for their land, as well as an identification card issued by a government agency certifying their status as farmers Neither of these requirements is easily fulfilled in a country where land tenure is not always clear and bureaucratic procedures far from painless, as documented by Ramos and Robison [1990, 317]

6 Individuals who persisted in their quest for credit often faced additional fixed costs of bribery or the use of influential intermediaries See Ramos and Robison [1990, 323]

7 Ramos and Robison [1990, 315]

8 Banco Nacional de Fomento [1989] A "small loan" is defined as a loan for less than 100,000 1980 sucres, or approximately 4,000 1980 dollars

9 Charvet [1987, 149] and Ramos and Robison [1990, 318] One might reasonably ask why banks do not prefer to make a larger number of smaller loans in order to diversify risk The answer seems to be twofold (1) agricultural loans represent such a small fraction of banks' portfolios that concentration of agricultural loans in a few hands is not viewed as very risky because of large collateral requirements, and (2) loans to smallholders are viewed by banks as inherently more risky than loans to large scale, commercial agricultural enterprises Smallholders may be viewed as higher default risks for two reasons First, many smallholders do not have clear title to their land, and hence the most obvious type of collateral is unavailable Second, large formal sector lenders may be unable to distinguish between high- and low-risk borrowers among smallholders as well as small-scale, local lenders (see Hoff and Stiglitz [1990, 237]) The reluctance to lend to smallholders may be so strong that banks find ways to evade administrative regulations that mandate lending to smallholders (for evidence on this score from Brazil see Anderson [1990])

10 Ramos [1989]

11 One must ask, then, why no secondary market in loans has emerged, with large farmers re-lending (with some markup) to small farmers One possible answer is high transaction or enforcement costs of the contracts that would link large and small farmers

Ecuadorian agriculture in this brief essay, instead, the focus will be on key trends in the one particularly important branch banana production [12]

Changes in banana production over the last thirty-five years have benefited large farmers to a much greater extent than small farmers The first significant change occurred in 1957, with the introduction of a producers' register designed to facilitate the fight against a banana plague [13] Most smallholders were not included in the register, which meant that they did not receive government-sponsored technical and financial assistance to fight the plague The second blow to smallholders came with the introduction of a new variety of banana in the mid-1960s Though the new variety is more plague-resistant, it is also more easily damaged in harvest and transport than its predecessor Costs of production rose because of the need to coddle the fruit at each stage of production, and many small farmers did not have the resources necessary to adopt the new variety

Finally, smallholders were buffeted by Standard Fruit Company's decision to initiate a system of associated producers in 1976, since very few smallholders were chosen as associated producers Standard Fruit's five-year contracts with its associated producers call for the company to provide the necessary credit for producers to make substantial capital investments, principally in three technological improvements irrigation by sprinklers, internal transport of the fruit by rail, and improvements in drainage systems [14] The company promises to buy all of an associated producer's output and to provide technical and managerial help In exchange, the producer agrees to sell fruit exclusively to the company and to transfer to the company technical and managerial control of the farm, retaining only labor responsibilities Other multinational companies quickly followed Standard Fruit's example and initiated systems of associated producers, leaving smallholders not affiliated with multinational corporations to seek their own sources of credit In this context, capital market imperfections will be quite prejudicial to smallholders, especially since research indicates that only substantial increases in capital investment significantly affect returns, small investments have little effect [15] As a result of the combination of technological change and imperfect capital markets, the yield gap (measured in terms of output per acre) between large, technically advanced, associated producers and smallholder production has widened substantially In 1984 this gap was estimated as 5 1 [16] Another consequence has been a decrease of almost 50 percent in the number of individuals involved in banana production (both directly and indirectly) between 1965 and 1983 [17] The area cropped in banana has also fallen significantly

How have smallholders adjusted to this discrimination in both capital and product markets? One response has been to diversify crops to lessen dependence on bananas The preferred second crop has been

12 Bananas were Ecuador's most important agricultural export and second-leading foreign exchange earner (second to petroleum) during the 1980s

13 The rest of this section draws heavily on Charvet [1987, 124–62]

14 Larrea [1987, 87]

15 A 1984 study estimated average yield attained per amount invested, the relationship is highly nonlinear, with a large, positive second derivative over certain ranges of investment See Charvet [1987, 149–50] To make matters worse for smallholders, the Ecuadorian government made credit market segmentation to banana producers an explicit policy in 1985, opening a new line of credit that was available only to technically advanced producers who had signed contracts with exporting companies

16 Charvet [1987, 140] Some of this yield gap may be due to scale economies rather than a combination of technological change and credit market segmentation Yet the evidence mustered above suggests that large farmers use a different technological bundle (improved varieties, fertilizer, irrigation, etc) than small farmers

17 Charvet [1987, 142]

cacao, but significant numbers of banana producers also raise cattle and/or shrimp A second response has been to attempt to sell inferior quality bananas to two Ecuadorian-owned banana exporters that specialize in secondary or tertiary markets (South America or Eastern Europe), although the price received is substantially below that received by associated producers [18] Finally, a significant number of smallholders have migrated from regions of declining small-scale banana production

III LABOR VS CAPITAL MARKET EXPLANATIONS FOR INTERNAL MIGRATION

Capital Market Imperfections as a Cause of Migration

Katz and Stark begin their model of migration with an assumption of imperfect capital markets, in which the return on assets R is an increasing function of the level of investment Y

$$R = R(Y) \tag{1}$$

where $R'(Y) > 0$ for some range of Y Given this structure of capital markets, they suggest that an individual whose initial level of wealth is A will be indifferent between migrating and staying in his/her origin location if

$$U\{A[1 + R(A)]\} = qU\{[A + W_j][1 + R(A + W_j)]\} + (1 - q)U\{[A + C][1 + R(A + C)]\}, \tag{2}$$

where q is the probability of finding employment at the destination, W_j is the wage in the destination area, C is the net reward of migration if the individual is unable to find a job, and U is the von Neumann-Morgenstern utility function defined on final wealth [19] There are two strong assumptions in (2) that are not discussed by Katz and Stark The first is that there is only one $R(Y)$ function for both origin and destination areas, implying that migrants either (1) can invest in their origin location after migrating, or (2) returns on assets are spatially invariant Either of these assumptions would produce only one $R(Y)$ function, which is what is present in equation (2) The second is the assumption of no wage income in origin areas, note that the left-hand side of equation (2) contains no W_i term Both assumptions are overly restrictive [20]

Clearly it is desirable to allow asset returns to vary spatially and to include an origin wage term Given these changes, the remaining issue is whether migrants continue to have access to asset markets in their origin areas If they continue to have access, and invest some fraction φ of their assets in the origin area and $(1-\varphi)$ in the destination area, the zero-migration condition becomes

$$\begin{aligned} U\{[A + W_i][1 + R_i(A + W_i)]\} &= qU\{\varphi[A + W_j][1 + R_i(A + W_j)] \\ &+ [1 - \varphi][A + W_j][1 + R_j(A + W_j)]\} \\ &+ (1 - q)U\{\varphi[A + C][1 + R_i(A + C)] \\ &+ [1 - \varphi][A + C][1 + R_j(A + C)]\}, \end{aligned} \tag{3}$$

18 Charvet [1987, 162]

19 In their original formulation Katz and Stark had C entering (2) with a negative sign This is incorrect if C is defined as the *net* reward to migration if the migrant *cannot* find a job

20 Especially in the Latin American context, individual migrants are likely to lose their access to origin asset markets, some evidence suggests this is less true in Africa If the decision to migrate were a family decision, then access to asset markets clearly would be preserved But Katz and Stark have derived equation (2) from an individual-maximizing framework The second possible justification for having only one $R(Y)$ is that returns to investment are spatially invariant To assume that capital markets are imperfect within a region but that capital is perfectly mobile between regions seems overly restrictive

where R_i and R_j are the return on assets available in origin and destination areas, respectively The special cases in which migrants invest only in origin or only in destination areas are subsumed under this general specification

Potential migrants will decide whether or not to migrate by comparing the utility obtained by not moving (the left-hand side of (3)) with the utility produced by moving (the right-hand side of (3)) The reduced-form migration equation that results from (3) is of the form

$$(4) \qquad m_{ij} = [W_i, W_j, q, C, R_i(A + W_i), R_j(A + W_j), R_j(A + C)],$$

where m_{ij} is defined following Schultz [1982] The variable m_{ij} is defined as the probability of migrating from i to j (migration flows from i to j divided by i's population) divided by the probability of not migrating (the population in i who remained in i over the entire period divided by i's population) Defining migration probability in this way—as the relative odds of migrating—assures that the adding-up constraint across regions is satisfied and allows estimation of a polytymous logit model [21]

Note that the asset return functions in origin and destination locations must be examined at points relevant for migrant decisions This is problematic, since these functions are defined over all ranges of Y, and migrants are heterogeneous with respect to asset levels Once different marginal rates of return are allowed for identical investment amounts across regions, it becomes even more difficult to distill a summary measure of returns to assets in origin and destination regions Several possible solutions to this problem are presented in section IV

21 Schultz [1982]

Labor Market Disequilibrium As A Cause Of Migration

As discussed in the introduction, there are a host of migration models which focus on labor market conditions as the prime determinant of migration Interstate gross migration models, in particular, yield reduced forms of the type [22]

$$(5) \qquad m_{ij} = f[W_i, W_j, q, d_{ij}, z_{ij}],$$

where W_i and W_j are origin and destination wages, q (as above) is the probability of finding employment, d_{ij} is the distance between origin and destination (proxying for the physical and psychological costs involved in moving), and Z_{ij} is the number of contacts an individual i possesses in destination j [23]

Comparing the reduced-form migration models given by (4) and (5), it is clear that the Katz-Stark and labor market disequilibrium models share many key variables Wages in origin and destination areas appear in both specifications, as does the probability of obtaining employment in destination areas The net reward of migrating if an individual is unable to find a job (C) in the Katz-Stark reduced form in practice will be highly collinear with the number of contacts a migrant possesses (Z_{ij}) As is often pointed out in the migration literature, the availability of a support network will affect the reservation wage a migrant is willing to accept, this is the case precisely because contacts affect the net reward from migration in case of job search failure A similar collinearity argument can be made for C and d_{ij}, since another important element of the

22 See Yap [1977] and Mazumdar [1988] For a treatment of the issue of observational equivalence in reduced-form migration models, see Becker and Morrison [1993]

23 Family, ethnic group or other contacts will lessen the financial cost of being unemployed by providing lodging and food while job search is being conducted

net reward to migration in case of job search failure is the cost of eventually returning to the place of origin Thus d_{ij} and Z_{ij} may be excellent proxy variables for C in the Katz-Stark model

In fact, the only major distinction between the two reduced forms is that capital market conditions appear only in the Katz-Stark specification [24] This distinguishing characteristic is used to evaluate the explanatory power of the two models in the following section

IV DISENTANGLING THE TWO EXPLANATIONS ECONOMETRIC ESTIMATION

Two issues will be addressed in this section The first is the selection of appropriate data series to capture the variables in the reduced-form equations The second is the estimation of reduced-form equations, and an analysis of the appropriateness of the two models for explaining internal migration Are labor market or capital market conditions driving internal migration, or is it some combination of the two factors?

Data Issues

Most of the variables contained in the reduced-form migration models are easily captured by available data series The data on migration flows come from the 1990 census (INEC [1991]), and the flows reflect inter-provincial moves that occurred between 1985 and 1990 Migration flows during this period were significant, over 460,000 migrants (5 5 percent of national population) moved from one province to another Provincial population for 1985 is taken from population projections made by the national statistics office (INEC [1985a]) Wage data come from an establishment survey of the manufacturing sector (INEC [1985b]) which permits disaggregation of wages by skill class Unemployment rates ideally should be used to measure the probability of obtaining employment, but no reliable provincial unemployment figures are available [25] Distance, the principal factor determining the cost of migration, is defined to be the distance between provincial capitals measured in hundreds of kilometers

Of course, the key variables in the estimation are those that distinguish the Katz-Stark capital market hypothesis from the more common labor market explanation for migration A crucial question then becomes how is it possible to measure the extent of capital market imperfections on a provincial level? One approach is to measure directly the distribution of credit in a province, those provinces with the largest share of credit disbursed in small loans are assumed to have the least imperfect capital markets [26] There are serious problems, however, with this simple approach To begin with, it is necessary to assume that small loans go to smallholders Second, and more problematic, the size distribution of farmers across provinces is probably not uniform [27] Thus, the fact that one province has a larger share of small loans (as a percentage of total credit) is not necessarily indicative of a lesser degree of capital market imperfection, it may only indicate the relative paucity of large farmers who would demand

24 As a one referee pointed out, Corden and Findlay [1975] have developed Harris-Todaro-type models that contain mobile and sector-specific capital Reduced forms from these models would contain some capital market variables—at a minimum the rental rate of capital, nonetheless, the vast majority of reduced-form interstate migration models (drawing on the Harris-Todaro tradition) contain only labor market variables

25 Unemployment rates calculated from the 1982 census were employed in several regression equations Perhaps because these rates are for years relatively distant from the years of migration flows the coefficients on origin and destination unemployment rates were never statistically significant

26 The definition of "small loan" is slightly different -- due to data availability—than that presented in footnote 7 above Here a small loan is defined to be less than 100,000 sucres (1985 sucres), or approximately 1,044 1985 dollars

27 Unfortunately, since the last agricultural census was carried out in 1974, there are not current data to examine this question

larger loans A final criticism of this measure of capital market imperfections is that it captures only part of the distribution of loans This criticism can be assuaged—although not completely eliminated—by entering the per capita availability of agricultural credit as another explanatory variable, thus providing more information about the distribution of credit [28]

For the reasons discussed in the preceding paragraph, it is likely that the variables "per capita agricultural credit" and "small loans as a percentage of total agricultural loans" measure the degree of capital market imperfection only very imperfectly [29] A standard econometric result is that the coefficient on the regressor measured with error will be biased toward zero, this measurement error will also affect the estimates of the other coefficients, but in directions that are difficult to determine a priori It is useful, therefore, to seek instrumental variables for the variables measured with error [30] Two variables are selected that are likely to be determinants of access to credit provincial land quality and change in area cropped in banana between 1983 and 1990 [31] The first may be a determinant of access to credit because high quality land is more valuable as collateral The second may be a determinant because certain crops (e g , banana) have been favored in government credit allocation decisions

Estimation of the Competing Migration Models

The migration models are estimated for inter-provincial migration in Ecuador over the 1985–1990 period The estimated equations are symmetric migration models, in that origin and destination conditions are assumed to exert equal, but opposite, effects on migration probabilities Thus, the regressors (with the exception of distance) are expressed as percentage differences between levels in destination and origin levels

In order to gauge the size of marginal impacts of changes in capital and labor market conditions, the results of several regression specifications are presented in Table I In all equations the dependent variable is the relative odds of migrating from province i to province j (the probability of migrating from i to j divided by the probability of staying in i) Equations (1) and (2) estimate migration equations using the two direct measures of capital market imperfections (per capita agricultural credit and small loans as a percentage of total agricultural loans), while equation (3) employs instrumental variables that attempt to capture access to credit In the equations (1 and 3) which employ manufacturing wages as a regressor, wages are disaggregated by skill class In the regression (equation 2) that employs commercial sector wages no such disaggregated wage data were available

In equation (1), unskilled manufacturing wages have no statistically significant impact on migration flows, while an increase in skilled manufacturing wages in destination versus origin area does increase migration Distance is a highly sig-

28 Per capita agricultural credit is defined as total agricultural credit disbursed by the National Development Bank divided by the number of individuals engaged in agricultural activities in rural areas

29 Symmetry, alas, is not always beautiful

30 The remaining variables, quite clearly, can serve as their own instruments in the instrumental variables estimation

31 Land quality is measured as the percentage of provincial land under short cycle cultivation These two instrumental variables were chosen for two reasons First and foremost, there is strong reason to believe that they significantly affect farmers' access to credit Second, the list of possible instruments available on a provincial basis for the period of this study is not very extensive Other possible instruments include regional dummies for the highland and/or coast and the area planted in other crops In practice, the regional dummies will be highly collinear with area cropped in banana, since banana is grown almost exclusively in coastal departments The area planted in other crops—most of which are subsistence crops, such as corn and potatoes—may be a reasonable proxy for lack of access to credit, since subsistence farmers rarely have such access Thus, this variable may capture some of the same effects—albeit with a coefficient of the opposite sign—as the banana variable

TABLE I
Determinants of Inter Provincial Migration Flows Ecuador, 1985-1990[a]

	1	2	3
Constant	-5 21***	-5 28***	-5 27
	(32 55)	(35 52)	(35 42)
Manufacturing Unskilled Wage	0 07		-0 20
	(0 41)		(1 20)
Manufacturing Skilled Wage	0 28**		0 67
	(2 31)		(5 14)
Commercial Wage		0 50***	
		(7 91)	
Distance	-0 39***	0 40***	-0 38***
	(10 82)	(12 07)	(10 67)
Per Capita Agricultural Credit	0 31***	0 28***	
	(2 62)	(2 60)	
Small Loans	-0 09	0 05	
	(1 58)	(0 98)	
Land Quality			0 001
			(0 15)
Area Cropped in Banana			0 10***
			(5 09)
R^2	0 32	0 41	0 34
R^2	0 33	0 41	0 35
F	32 67	59 69	36 70
n	342	342	342

[a]Regressors are expressed as percentage difference between destination and origin values (except distance) The equation estimated is a polytymous logistic function

The dependent variable is ln (P_{ij}/P_{ii})

***significant at 1 percent level

** significant at 5 percent level

* significant at 10 percent level

t-statistics in parentheses

nificant deterrent to migration, a result which is a bit surprising given Ecuador's small size[32] Of the variables measuring capital market imperfections, only the per capita availability of agricultural credit is statistically significant It has the correct sign an increase in per capita agricultural credit in destination versus origin areas increases migration

Equation (2) replaces the manufacturing wage term with the commercial sector wage This is important given that many migrants have little prospect of working in formal manufacturing sectors and instead seek employment in the informal commerce sector[33] Once again, the wage term has the expected sign and is statistically significant The remaining coefficients retain their signs and approximate

32 As will be seen below however, the elasticity of migration with respect to distance is tiny

33 See Cole and Sanders [1985]

magnitudes, which is a sign of model stability and robustness The overall explanatory power of the regression equation rises significantly (vis-a-vis equation (1)), which suggests that commercial sector wages may be a more important determinant of migration flows than manufacturing wages [34]

As mentioned above, the direct measures of capital market imperfections may measure credit availability only imperfectly Equation (3) addresses this problem by employing an instrumental variables procedure to replace the potentially troublesome variables The coefficient on only one of the two instrumental variables—change in area cropped in banana—is statistically significant, it has a sign consistent with the theory sketched above An increase in area cropped in banana may be associated with a decrease in credit availability for smallholders, because credit allocations have favored large banana producers (see section II) Thus, an increase in area cropped in banana in destination versus origin area is associated with less migration Interestingly, the goodness of fit of this equation (as measured by the $\bar{R}^2$ and the F-statistic) is slightly improved over that in equation (1) This lends some support to the argument that the direct measures of capital market imperfections suffer from measurement error, although the improvement in fit is not that impressive

It is also interesting to note that only skilled manufacturing wages are significant determinants of migration probabilities in equations (1) and (3), unskilled manufacturing wages, in contrast, have no statistically significant effect on migration Commercial sector wages, in contrast, do exert a significant effect on migration flows This evidence is consistent with the hypothesis that wages for skilled labor drive migration flows to manufacturing sectors At the same time, the results are also consistent with the Cole-Sanders [1985] hypothesis that many migrants seek work in the petty commerce rather than in formal manufacturing sectors

An important issue is the relative explanatory power of capital market versus labor market factors The basic decomposition of the sources of variance of migration probabilities is presented in Table II The sources of variance are grouped into two categories capital market effects and covariates The covariates include the variables found in "traditional" (labor market-oriented) migration models wages and distance These traditional variables explain between 27 and 39 percent of the variation in migration probabilities depending upon the regression specification, while capital market effects account for between 2 and 6 percent of the variation Thus, capital market variables explain between 4 9 and 18 2 percent of the explained variation in migration probabilities

These results do not contradict the conventional wisdom that labor market conditions are the prime determinants of internal migration flows, but they do add a very important caveat Capital market conditions also play an important role, accounting for up to one-sixth of the variation in migration probabilities This is an important result, especially since capital market variables are not usually included in reduced-form migration equations Not surprisingly, an F-test allows us to reject (at the 10 percent level) the null hypothesis that the capital market effects are statistically insignificant

In addition to the information yielded by the variance decomposition, the relative size of the marginal effects is also of interest To this end, the elasticities of the relative odds of migration with respect to the regressors are calculated for each of the regression equation specifications These elasticities, calculated at the means,

34 This is the case whether manufacturing wages are disaggregated by skill type or not

TABLE II
Variation in Migration Probabilities Explained by Labor and Capital Market Variables

Regression Equation	1	2	3
1 **Full Regression**			
Capital Market and Covariates	0 33	0 41	0 35
2 **Covariates First**			
Covariates	0 29	0 39	0 29
Capital Market	0 04	0 02	0 06
3 **Capital Market Variables First**			
Capital Market	0 06	0 06	0 04
Covariates	0 27	0 35	0 31
Percent of Explained Variance Accounted for by Capital Market Variables (low/high)	12 1/18 2	4 9/14 6	11 4/17 1

are reported in Table III[35] The elasticities with respect to wages are quite large A 10 percent increase in destination wages relative to origin wages is associated with between a 16 1 and 41 9 percent increase in the relative odds of migrating The elasticity with respect to distance is minuscule, perhaps reflecting Ecuador's small size, increased distance does deter migration, but the size of the effect is tiny Finally, the elasticities with respect to per capita credit availability and change in area cropped in banana are quite large, ranging (in absolute value) from 1 47 to 1 89 In general, the elasticity of the relative odds of migration with respect to per capita agricultural credit rivals in importance the elasticities with respect to labor market variables, the elasticities with respect to capital market factors are much larger than distance, and of approximately the same magnitude as migration elasticities with respect to wages

35 In this section I discuss only those elasticities computed on the basis of statistically significant coefficient estimates

V CONCLUSIONS

This essay began with a simple proposition in order to guide intelligent migration policy, one must know whether the fundamental disequilibrium lies in capital or labor markets This essay has shown -- at least in the Ecuadorian context—that capital market conditions play an important role in generating migration flows One can only suspect that this conclusion is much more general, given the ubiquitous nature of capital market imperfections in less developed countries

The finding that capital market conditions affect migration has sobering implications for migration modeling since it implies that the coefficients estimated in traditional reduced-form models may suffer from rather severe omitted variable bias Since, as was shown in section III, the

TABLE III
Elasticities of Migration Probability with Respect to Independent Variables

	1	2	3
Manufacturing Unskilled Wage	-0 58		-1 67
Manufacturing Skilled Wage	1 75*		4 19*
Commercial Wage		1 61*	
Distance	-0 000008*	-0 00001*	-0 00001*
Per Capita Agricultural Credit	1 63*	1 47*	
Small Loans	-0 19	0 10	
Land Quality			0 0
Area Cropped in Banana			-1 89*

*Elasticity based on statistically significant coefficient Equation numbers correspond to regression equations in Table I

traditional reduced form is really a special case of the more general reduced form that includes capital market conditions, it should not be surprising that the traditional reduced forms generally have produced econometrically acceptable results

One immediate policy lesson that emerges from this analysis is that subsidized credit policies—designed ostensibly to help the small farmer—may instead institutionalize capital market imperfections, and thus indirectly spur outmigration from the very regions such policies were designed to benefit Another important lesson is that the range of policy instruments available to policymakers to influence migration decisions is much wider than a narrow application of Harris-Todaro-type models—or even adaptations such as that suggested by Cole and Sanders—would suggest To the extent that capital markets play a key role in determining migration flows, policy interventions—where such are warranted—should have a wider focus than wages and unemployment rates in the various sectors [36] Various combinations of policy interventions can be used to attain a given reduction in migration rates If the marginal cost of using any one instrument is increasing, this means that policy objectives can be achieved at lower cost

36 This argument should not be interpreted as a call for liberalizing credit markets in order to stem rural-urban migration As previous work by Morrison [1993] has shown, recent migration flows in at least one Latin American country have been welfare-improving even after the relative price distortions favoring urban areas have been taken into account

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