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# Life-Time and Recent Migration to Bolívar State, Venezuela, 1990: The Effect of the Guayana Program

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## Abstract

In 1959, the Venezuelan government erected a new industrial city, Ciudad Guayana, in the Southeastern State of Bolívar. The purpose of the city was to divert potential migrants from the already overcrowded Caracas Metropolitan Region. Using regression Analysis, this paper examines recent migration flows (1981-1990) to each of the ten municipios in the State of Bolívar to determine if the aggregate characteristics pertaining to the migrant's origin state were significantly different for migrants who selected Caroní *municipio* (the location of Ciudad Guayana) and the other nine municipios in Bolívar. Results indicated that distance was the most important variable for recent immigrants to Caroní as well as for the other three municipios which together form the northern frontier of Bolívar State. The most important predictor variable for the remaining municipios was total population of the origin state. Although Caroní was more successful in attracting recent migrants than any of the other municipios, the characteristics pertaining to the origin states of these migrants do not differ significantly from other municipios, suggesting that the growth pole was not successful in drawing migrants from the capital region as originally intended.

Key words: *growth poles, migration, Venezuela, Ciudad Guayana.*

## Introduction

Developing countries have been confronted with several demographic changes over the last half of the twentieth century. These changes include rapid population growth caused by a decline in the death rate and rapid urbanization, due in part to the higher population growth rates as well as the increased migration to urban areas. These two phenomena have led in many instances to an accumulation of population and economic resources in the country's capital city. In many instances, the draining of the most capable population from rural and smaller urban areas to these capital cities has resulted in an impoverished peripheral sector of the country. Theoretically, with the process of economic development, income differentials between urban and rural areas should decline resulting in the slowing of migration to the core region (Todaro 1969). The country should then experience a more balanced distribution of both economic resources and population. If this fails to occur, governments may attempt to counteract this situation by stimulating movements of population and industry to cities lower in the national hierarchy. In order to deflect some of the excess migration from rural areas to the core regions in many developing countries, secondary cities were planned or governmental policies were enacted to help promote a more equal distribution of population and economic resources throughout the country. Frequently frontier regions that were rich in natural resources became the focal point for such plans with the goal

being to stimulate economic and industrial activity in a previously inaccessible region of the country (Li 1997; Roessler and Azam 1990; Hackenberg 1982).

The benefits and drawbacks of planned secondary cities in developing countries were carefully evaluated in the 1960s, 1970s, and early 1980s. Since the mid 1980s, analyses of these cities have been relatively scarce. It is likely that part of the reason for the neglect of secondary cities by social scientists is the overwhelming consensus that these cities were mostly failures (Rondinelli 1983). In an exhaustive critique of Latin American urbanization research over the past forty years, Czerny, van Lindert, and Verkorren (1997) noted the lack of attention given to intermediate and smaller cities. Ciudad Guayana, a planned industrial city located in Bolívar State, Venezuela, is one such urban area that has not been studied since the early 1980s and that is the focus of this paper. The principal question is what aggregate variables of the population at the state of origin predict migration to different municipios within the state of Bolívar?

### *Ciudad Guayana*

At the beginning of the twentieth century, Venezuela was a typical underdeveloped country of Latin America with a low per capita income and a mostly rural population. With the subsequent discovery of enormous oil reserves in the 1920s, Venezuela was propelled into the international economy. The source of 73.0 percent of the nation's oil reserves was in the Maracaibo Basin (López and Venturini 1967) which attracted migrants from the western highlands to Maracaibo in search of employment in the oil industry or the ancillary services supported by this industry. Much of the oil wealth was spent on lavish projects in Caracas which in turn stimulated migration from all regions of the country to the capital. Barquisimeto, a city equidistant between Maracaibo and Caracas grew as a link between the two cities. By 1950, Venezuela was already 47.9 percent urbanized with 40.1 percent of the urban population residing in these three cities.

Unfortunately, the industrial and economic growth of Venezuela did not keep pace with that of urbanization. Foreign companies were siphoning off profits from the oil wealth that could have been used in the economic development of the country. In addition, by the 1950s, the Venezuelan government realized that an inordinate percentage of the population was poverty-stricken whether residing in the overcrowded Caracas metropolitan region or residing in the peripheral regions of the country and this was not conducive to national objectives income equality (Friedmann 1969; Blanco and Ganz 1969; Rodwin 1970; Haggerty 1993). These two conditions provided the impetus for a massive program of industrialization and population redistribution.

The planned industrial city of Ciudad Guayana was to be located in the Orinoco basin of southeastern Venezuela, 450 kilometers from Caracas (Figure 1) and was designed to act as a growth pole for population and industry, thus effecting a more even distribution of population and income throughout the nation. In 1959, the Corporación Venezolana de Guayana (CVG) was established by President Betancourt and with help from the Massachusetts Institute of Technology and Harvard University; plans for the new city were put into effect. The Guayana region was a logical place to erect a city. It was located at the confluence of the Caroní and Orinoco rivers which would provide water power for the generation of electricity. Huge reserves of iron ore, natural gas, petroleum and forested land were all available. All of these physical endowments made the region a natural choice for the location of an industrial complex.

Friedmann (1969) compared the Guayana Project in Venezuela with the economic development of the Tennessee Valley in the United States. The basic difference

between the two development projects was that Ciudad Guayana was to be developed so that the whole of the Venezuelan economy could be improved by taking advantage of the natural resources in the Guayana region, while in the case of the Tennessee Valley Program, development was designed to integrate this economically depressed region into the American economy as a whole.



Figure 1. Venezuela by State, 1990.

Two mining settlements, San Félix and Puerto Ordaz, established in the 1940s when the region was being exploited by U.S. steel companies, provided the urban base for the new industrial city. These two urban settlements grew from a few scattered villages with a total population of approximately 3,500 in 1950 to an intermediated-sized urban area of approximately 60,000 and a growth rate of 20.0 percent per year (Friedmann 1966) by the mid 1960s. In 1950, the urban area that was to become Ciudad Guayana only had 6.3 percent of the urban population in the Guayana Region, but by 1971, it held 44.8 percent of the urban population (Izaquirre 1977). Much of the growth of Ciudad Guayana was a result of the attraction of migrants from the Guayana region itself, defined as the states of Bolívar and Delta Amacuro. Economic opportunities were the prime reasons for the flow of migrants into Ciudad Guayana (Friedmann 1969; Robinson, 1969; Rodwin 1970). Even though Bolívar State had a per capita income that was only 70.0 percent of the national average in 1961 (Chen 1967), it still sustained a high rate of immigration. Given that most of the migrants to Bolívar were from eastern Venezuela, a region with even lower per capita incomes than Bolívar State, an improvement over previous standards of living was anticipated by most migrants. Ciudad Guayana grew not only though the addition of migrants, but also through natural increase. Most of the female migrants were from eastern Venezuela, which had the highest birth rates in the country in the

1960s. These high fertility rates were retained after relocating to the new city (MacDonald 1969). As a result of these conditions, by 1990, Ciudad Guayana had a population of 453,047 and was the fifth largest city in Venezuela.

### *Economic Development and the Primate City*

Whereas in today's industrialized countries, urbanization and industrialization occurred simultaneously, urbanization has occurred in the absence of industrialization in lesser developed countries (Oberai 1993a; Goldscheider 1993; Prothero 1987). At the times that many European nations and the United States were undergoing the process of industrialization, excess agricultural workers could be absorbed into the growing manufacturing base of expanding urban areas. Presently, this is not the case in developing countries where labor-intensive manufacturing has often been replaced by capital-intensive manufacturing which eliminates the need for many industrial workers (Berry 1981; Gugler, 1988; Choguill, 1994). However, the population growth and corresponding low wages in rural locales of developing nations in the mid-twentieth century pushed populations out of the countryside because of the lack of any other alternatives and these rural dwellers have converged upon urban areas in excessive numbers (Oberai 1993a; Petrakos 1992).

The concentration of economic resources and population in the largest city of a nation has been a recognized aspect of economic development since Jefferson (1939) first proposed his law of the primate city. This law states that once a city obtained a certain level of a nation's economic resources and population, it would continue to perpetuate its growth and thus obscure the growth of all other cities in the urban system of that nation. Traditionally, it was assumed that agglomeration economies were necessary to allow development to proceed apace (Alonso 1971). The argument propounded was that the labor force, market and infrastructure to support the industrialization process are only realized after a certain threshold of population is reached in a city.

El-Shahks (1972) illustrated that development is a condition more often seen in the form of an inverted U-shaped pattern. Those countries that are very low or very high in terms of economic development showed the highest degrees of primacy. De Cola (1984), Alperovich (1992) and Wheaton and Shishido (1981) support this relationship finding that the more industrialized countries of Europe, the United States and the Soviet Union as well as many countries in Africa (the least developed of all the world's regions) illustrated very low levels of primacy. Countries in Asia, the Middle East, and Latin America that are mostly indicative of countries somewhere in the intermediate stages of economic development, illustrated the highest levels of primacy. Vining (1986) found in his study of migration to core regions of developing nations between 1950 and 1980 that those classified as the most advanced of the underdeveloped countries actually exhibited a decline in the rate of migration to the core during the 1970s. This suggests that as a country precedes along the path to industrialization that migration to core regions will decline as a percentage if all migration this affecting the level of primacy.

In contrast to the above show results concerning urban primacy, Mehta (1964) and Sheppard (1982) in their studies found that no relationship existed between the degree of primacy of a nation and the level of economic development. This casts serious doubt on the explanatory power of the primate city model.

### *Population Dispersal Policies in Latin America:*

High levels of urbanization in Latin America and the growth of primate cities prior to the mid-twentieth century stimulated policies designed to redistribute the

population in a more equitable way. Regional industrial policy in Argentina has been in existence since the 1920s. Morris (1987) in his study of growth poles in Argentina found that even though by mid-century several growth poles were established throughout Argentina, fifty-five percent of the value-added manufacturing was still emanating from Buenos Aires. It appears that part of the reason for the failure of these growth poles was that state and private investment was not stimulated sufficiently. In addition, the location of growth poles was often unsuitable. Jameson (1979) in his study of deconcentration of industry and population in Peru found that during the period from 1948 to 1972, the share of industrial production that originated in the Lima-Callao area had actually increased even though the government directed growth to other regions. Likewise, Chile's attempt at deconcentration of population and industry away from Santiago in the 1960s and early 1970s to several secondary cities was largely a failure (Lozano 1975).

The Mexican government in the 1970s constructed a major new town on the outskirts of Mexico City called Cuautitlán Izcalli which was supposed to eventually hold a population of 1.6 million. The new planned city was located only twelve miles from Mexico City and was designed to decentralize activities away from the Metropolitan area. The factors affecting the location of Cuautitlán Izcalli were the availability of adequate water resources and an infrastructure that was previously established. The expected benefit of the new city was to lure industry away from Mexico City and not necessarily draw in industry from other states or abroad. The overall consensus was that the plan had limited success (Bock and Rothenberg 1978).

Lowder (1997) examined the growth of Ecuador's cities between 1950 and 1990 to determine the impact that decentralization programs, funded with oil wealth of the 1970s and 1980s, had on the growth of secondary cities. The two primate cities of Quito and Guayaquil had growth rates exceeding that of intermediate cities between 1950 and 1962, but between 1962 and 1990, the overall growth rate of secondary cities exceeded that of the two primate cities. However, the fastest growing intermediate cities were actually satellite cities of either Quito or Guayaquil, while the growth of intermediate cities on the coast was more related to the growth of exports in primary products. Immigration to these coastal cities was due to employment opportunities for rural migrants who could no longer be supported by the declining agricultural sector, rather than to any effort on the government's part to disperse the population. Given these circumstances, Lowder concluded that deconcentration would have occurred without government involvement.

Nuhn (1997) examined the role of decentralization policies on the development of intermediate and small cities in Costa Rica. He found a more strengthened role for intermediate cities in 1985 than in 1971. These intermediate cities had acquired certain roles that were traditionally found only in the capital city and thus were less dependent on San Jose for development. However, smaller cities located next to larger cities experienced slow growth during the study period. It would appear that Costa Rican decentralization policies were only partly effective. Although reducing the importance of the highest urban centers, and diffusing development to the larger secondary cities, medium and small sized cities remained mostly stagnant.

## Modeling Migration

Numerous migration studies have been conducted over the past half century to analyze internal migration in developing countries. As such, a number of variables have been found to be important in the development of migration models. Two of the most important components of the migration calculus are found in the gravity model and the labor migration model. The gravity model incorporates the variables of

distance and total population and assumes a constant decrease in interaction (migrational behavior) with increased distance. Interaction between two locales also depends upon the population bases of these locales. The larger the population base of either the origin or destination the more interaction is assumed to occur. The labor migration model considers economic characteristics at the origins and destinations (e. g. average wage and unemployment rate) to be important in the migration process. This model assumes that migrants are economically rational and will seek out destinations with higher economic returns than is available at the origin. The following are representative migration studies undertaken over the past several decades in Latin American countries that support both the premises of the gravity and labor migration models: Sahota, 1968 (Brazil); Fields, 1982 (Colombia); Brown and Lawson, 1985 (Costa Rica); and Brown and Lawson, 1989 (Venezuela).

#### *Definition of Terms Used in the Study*

- Life-time migrant: an individual that was born in another state of Venezuela but was enumerated in Bolívar State in the 1990 census.
- Recent migrant: individuals born in another state but who migrated to the state of Bolívar after 1980 and were enumerated in Bolívar in the 1990 census.
- Municipios: political subdivisions of the states of Venezuela.
- Income: the 1990 census provided the number of individuals making an income within certain categories for each state. The mid-point of each of these income categories was then multiplied by the number of individuals within that income category. Each of the income categories was summed and then divided by the total number of employed persons in that state. For the highest income category, the dividing figure between the highest and next highest incomes was used instead of a midpoint.
- Education: the percentage of persons over age 12 that have completed at least eight years of schooling.
- Unemployment – the percentage of the origin state's population in the labor force over age 15 that is unemployed.
- Distance: this variable was determined by using a calculated centroid from each origin state. Using ArcView GIS, total population for each municipio in Venezuela was plotted and a population centroid for that state was determined. For the destination municipios of migrants within Bolívar State, the capital of the municipio was used to measure distance. Distance between the calculated centroid for each state and each municipio in Bolívar State were determined by using ArcView's distance tool. Since road distance has not been accurately determined for eight of the ten municipios, ArcView Euclidean distance was used.

#### *Methodology*

After providing an account of the destination of life-time migrants and recent migrants (defined as migration that took place between 1981 and 1990) to the ten

municipios that make up the state of Bolívar, regression analysis is applied to determine the variables at the state of origin that are responsible for recent migration to Bolívar State by municipio. Given that the independent variables are all selected from 1990, it is hoped that an analysis of migration that took place during the 1980s would be more informative than life-time migration that could have been undertaken decades previously. It is predicted that the aggregate characteristics of the states of origin of migrants to Caroní municipio will be different from the other nine municipios that were not included in the development of the industrial growth pole. Although a migration model could be implemented using aggregate characteristics from the origin states as well as aggregate characteristics of the destination municipios, such a model would provide one regression equation and would not allow for the examination of differences between the municipios. With nine other destinations in the regression equation, it would be impossible to discern the true impact of Caroní (Ciudad Guayana) on migration behavior. Furthermore, municipio level data is used because migration data are not disaggregated by city level in the 1990 census.

The raw data were obtained from the Venezuelan Census of 1990. The number of recent immigrants to each of the ten municipios serves as the dependent variable for all regressions. Six variables are tested in each of the regressions and include the population at the origin, income at origin, the unemployment level at origin, the percentage of labor force in manufacturing at origin, the distance between the origin state and the municipio of destination, and the educational level of the population at the origin. Distance and the unemployment level are hypothesized to be negatively related to migration from an origin state, while all other variables are predicted to be positive. The dependant variables and total population and distance were transformed to logarithms to correct for nonlinearity of the data.

*The Migration Model is as follows:*

$$M_{ij} = P_i, D_{ij}, E_i, U_i, I_i, M_i + e$$

Where

$M_{ij}$  = is the number of recent migrants from the origin state to the destination municipio

$P_i$  = population at the origin

$D_{ij}$  = straight-line distance between state of origin and municipio of destination

$E_i$  = educational level of the population at origin

$U_i$  = unemployment level at state of origin

$I_i$  = median income level at the state of origin

$M_i$  = percentage of the labor force employed in manufacturing at the origin

$e$  = an error term that accounts for unexplained variance

## Results

### *Immigration to the State of Bolívar by Municipio, 1990:*

In 1990 there were 243,765 individuals residing in Bolívar State who had been born in other states of Venezuela. This represented 27.1 percent of Bolívar's population. Of these individuals, 71.9 percent resided in the district of Caroní. It is apparent that Caroní is a major attraction for the life-time immigrant population since only 49.1 percent of Bolívar's general population (natives and immigrants) resided in this district in 1990 (Table 1A and 1B, Figure 2). Four states in northeastern Venezuela: Anzoátegui,



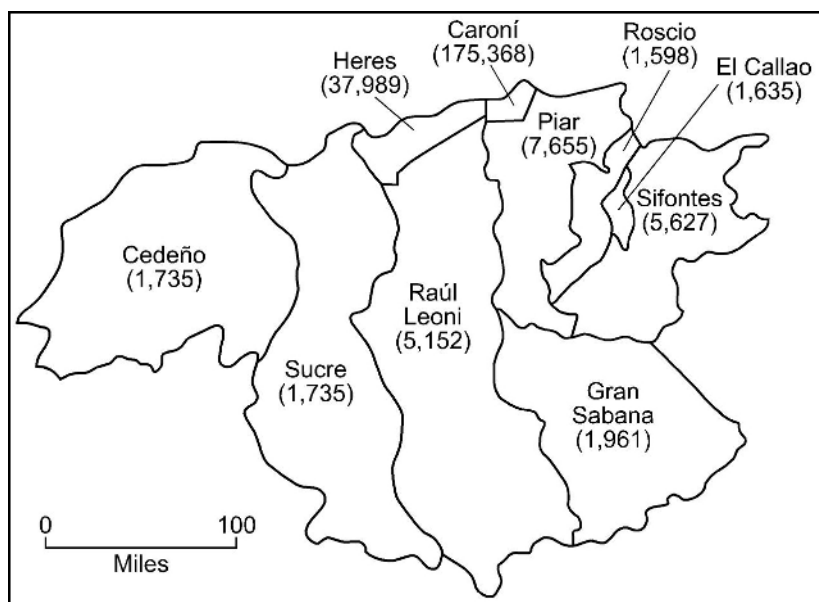


Figure 2. Number of life-time migrants to Bolívar State by municipality, 1990.

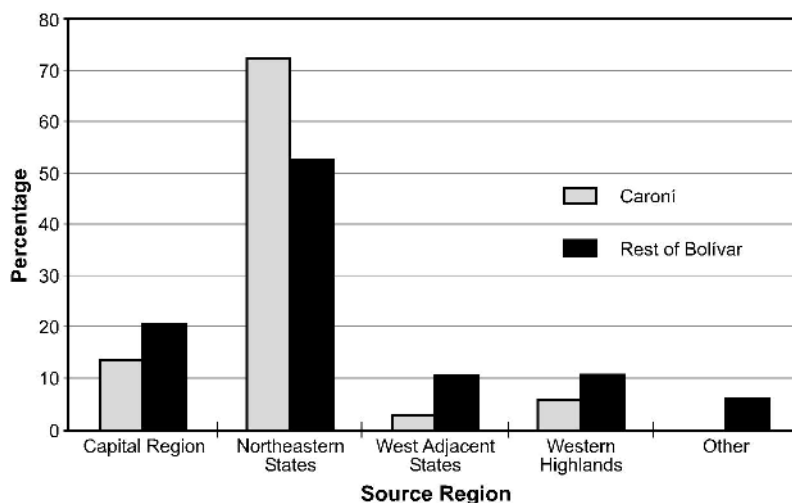


Figure 3. Life-time migration to Bolívar State from other Venezuelan States, 1990.

Monagas, Sucre, and Delta Amacuro supplied Caroní (Figure 3). Migrants from the capital region, defined as the Federal District, Aragua, Carabobo, and Miranda, supplied Caroní with 13.4 percent of total migrants as opposed to 20.0 percent for the rest of

the state. Migrants from the highlands states of Barinas, Cojedes, Mérida, Portuguesa, Táchira, Trujillo and Yaracuy, supplied 5.7 percent of all migrants to Caroní versus 10.5 percent for Bolívar, excluding Caroní municipio. It appears that there is a distinct distance and directional bias for migration to Caroní with most of its migrants coming from the northeastern states as has been noted since the implementation of the Guayana Program in the 1960s (MacDonald 1969; Friedmann 1969).

The second most important destination for life-time immigrants to Bolívar was the district of Heres where Ciudad Bolívar, the second largest city of the state, is located. This district attracted 15.6 percent of all life-time migrants to Bolívar as of 1990. For the general population of Bolívar, 25.0 percent resided in this district in 1990. Therefore, Heres district attracted fewer life-time migrants than would be predicted from the relatively large population base that it had in 1990, whereas Caroní municipio attracted migrants well in excess of that expected by its percentage of the state's population. Regardless, these figures reveal that most of the life-time immigration to Bolívar State, 87.5 percent, was found in one of these two locales. Amazonas was the only origin state that had a greater percentage of its migrant population settling in Heres, 36.2% versus 24.6% for Caroní. It is likely that Heres, the municipio where Ciudad Bolívar is located, was acting as an intervening opportunity for migrants from Amazonas which is located in the southwest part of Venezuela. Likewise, the very high percentage of migrants from Sucre, Monagas, Delta Amacuro, and Nueva Esparta settling in Ciudad Guayana was due to this city acting as an intervening opportunity, not allowing much of the migrant flow through to district to Heres. The other eight municipios of the state were not very important as migrant destinations, representing a combined total of only 12.5 percent of all life-time migration to the state of Bolívar whereas their total of Bolívar's population is approximately 25.0 percent.

Table 1B compares the percentage of immigrants to Bolívar State by municipio for both life-time and recent migration as of 1990. Although Caroní was still the number one destination for immigrants to Bolívar, only 66.4% of recent migrants selected Caroní in comparison to 71.9 percent of life-time migrants. The rest of the municipios were more represented in recent than in life-time migrant flows to Bolívar. However, this does not necessarily indicate that Caroní was less attractive to migrants from other states during the 1980s given that several of the municipios may fail to retain migrants over a long period of time.

### *Regression for the Ten Municipios of the State of Bolívar, 1990:*

In this section regressions are run for recent migration (defined as migration that took place anytime between 1981 and 1990) by state to each of the municipios of Bolívar in 1990 (Table 2). Caroní municipio had an  $R^2$  of 0.749 with distance, total population, and industry as the predictor variables. Heres, the other major competitor for migrants to the state of Bolívar, had distance and total population entering the regression equation with an  $R^2$  of 0.656. The majority of recent migrants to the state of Bolívar were responding foremost to distance, followed by that of total population. This corresponds with the traditional gravity model. Migrants from states with a low percentage of the labor force employed in manufacturing were attracted to Caroní, which had an industrial base that was likely to provide employment opportunities in industry or ancillary occupations. The industry variable also indicates a low level of urbanization and it is likely that some individuals were pushed from such states due to overpopulation in rural areas and the lack of economic opportunities.

| Municipio   | Life-Time In-migrants | Recent In-migrants |
|-------------|-----------------------|--------------------|
| Caroní      | 71.9                  | 66.4               |
| Cedeño      | 2.1                   | 3.3                |
| El Callao   | 0.7                   | 1.3                |
| Gran Sabana | 0.8                   | 1.3                |
| Heres       | 23.6                  | 31.5               |
| Piar        | 3.1                   | 3.7                |
| Raúl Leoni  | 2.1                   | 3.0                |
| Roscio      | 0.7                   | 1.1                |
| Sifontes    | 2.0                   | 3.6                |
| Sucre       | 0.7                   | 0.8                |

Table 1: Percentage of Life-Time and Recent Migrants for the State of Bolívar, by Municipio, 1990. *Source:* Table 7, *El censo en Venezuela*, Estado Bolívar; Central de Estadística e Informática, Caracas, 1995.

The regressions for the remaining eight municipios of Bolívar convey a different pattern. Recent migrants to Raúl Leoni, Piar, El Callao, Gran Sabana, Sifontes, and Roscio, all located in the populous eastern portion of Bolívar, responded foremost to total population of the origin state. It would appear that Ciudad Guayana in Caroní municipio and Ciudad Bolívar in Heres municipio were intervening opportunities for migrants who may have subsequently gone to one of these five municipios. It is likely that migrants to the five smaller municipios had specific reasons for targeting these municipios, possibly related to professional occupations where they were more likely to overcome the friction of distance. It is also possible that migrants who originally settled in Heres or Caroní districts later migrated to one of these municipios. El Callao, with 1.3 percent of the entire recent migrant flow to Bolívar State, was the only municipio where median income of the source region of migrants was a predictor variable. The relationship was negative indicating that migrants from the poorest states were found in El Callao. Since it is unlikely that poor migrants would come all the way to eastern Bolívar, it is suggested that the third largest city in Bolívar, Upata, likely provided employment opportunities to a select cadre of professional/skilled migrants. Given that the total population of the origin state explains the most variance in migration to El Callao, it is probably safe to assume that migrants to El Callao were recruited from the poor states of the more remote western highlands and not from the poor states of northeastern Venezuela.

The only variable of significance for the most western municipio of Cedeño was distance with an  $R^2$  of 0.336. This municipio recruited most of its migrants from the western highlands where population pressure was intense and urbanization and per capita incomes were low. Distance and total population ( $R^2$  of 0.758) predicted migration to Sucre, another municipio in the isolated western half of the State of Bolívar.

Do the aggregate characteristics of immigrants from other states to Caroní municipio differ from that of other municipios? The results appear to be mixed. Caroní has attracted the great majority of migrants to Bolívar State from other states, but it differs little from the characteristics of its nearest competitor, Heres, in terms of migrant-attraction and population size. Given that the capital, Ciudad Bolívar, was not a growth pole and did not receive significant government investment in the 1960s, yet attracts migrants from origin states with the same aggregate characteristics,

suggests that government investment in Caroní (Ciudad Guayana) may have done little to attract migrants from the overpopulated states of the western highlands and the capital region. However, when Caroní is compared with the other eight municipios of Bolívar, it is apparent that the predictor variables are less similar. Particularly, total population of the origin state is a more powerful predictor than distance, for most of the other municipios.

|                  | Caroní           | Cedeño           | El Callao        | Gran Sabana         | Heres            | Piar             | Raúl Leoni       | Roscío            | Sifontes          | Sucre            |
|------------------|------------------|------------------|------------------|---------------------|------------------|------------------|------------------|-------------------|-------------------|------------------|
| Constant         | 0.817<br>(1.097) | 6.609<br>(1.456) | 8.954<br>(4.609) | 1.53E+00<br>(1.555) | 2.116<br>(1.095) | -1.704<br>(.935) | 1.159<br>(1.342) | -1.544<br>(1.436) | -1.748<br>(1.428) | 6.64<br>(1.609)  |
| Distance         | -1.522<br>(.251) | -1.932<br>(.607) | -2.046<br>(.357) | -2.072<br>(.630)    | -1.571<br>(.320) | -1.34<br>(.224)  | -1.737<br>(.463) | -1.359<br>(.378)  | -1.203<br>(.411)  | -4.195<br>(.587) |
| Total Population | 1.205<br>(.230)  |                  | 1.767<br>(.231)  | 1.009<br>(.184)     | 0.764<br>(.168)  | 1.417<br>(.198)  | 0.907<br>(.203)  | 1.322<br>(.322)   | 1.434<br>(.289)   | 0.825<br>(.204)  |
| Manufacturing    | -0.879<br>(.392) |                  | -0.841<br>(.387) |                     |                  | -1.34<br>(.224)  |                  | -1.086<br>(.515)  | -1.27<br>(.484)   |                  |
| Income           |                  |                  |                  |                     |                  |                  |                  |                   |                   |                  |
| R2               | 0.749            | 0.336            | 0.812            |                     |                  |                  |                  |                   |                   |                  |
| Adjusted R2      | 0.708            | 0.303            | 0.768            | 0.618<br>0.577      | 0.656<br>0.62    | 0.804<br>0.771   | 0.573<br>0.528   | 0.58<br>0.506     | 0.608<br>0.542    | 0.758<br>0.731   |

Figures in Parentheses are unstandardized regression coefficients.

Table 2: Logarithmic regressions for recent migrants (1981-1990) to Bolívar State by municipio.

An analysis of migration without consideration of pull factors is largely speculative. Table 3 displays total population and urbanization level of the ten municipios of Bolívar State. However, the lack of disaggregation of economic and educational variables by municipio severely limits any conclusions concerning pull factors. Heres and Caroní are not only the most populated municipios in Bolívar, but are also the most urbanized. If urbanization is a substitute variable for economic development, then it is quite reasonable that the largest and most economically developed municipios attract the vast majority of immigrants to Bolívar.

| Municipio   | Total Population | Urbanization Level |
|-------------|------------------|--------------------|
| Bolívar     | 900,310          | 89.0               |
| Caroní      | 465,738          | 97.3               |
| Cedeño      | 34,445           | 65.6               |
| El Callao   | 10,648           | 72.0               |
| Gran Sabana | 16,235           | 40.6               |
| Heres       | 230,001          | 98.0               |
| Piar        | 74,305           | 67.4               |
| Raúl Leoni  | 21,280           |                    |
| Roscio      | 12,535           | 79.0               |
| Sifontes    | 24,281           | 61.2               |
| Sucre       | 10,842           | 0.0                |

Table 3: Total population and urbanization level of the ten municipios of Bolívar State, 1990. *Source:* Table 7, *El censo en Venezuela*, Estado Bolívar; Central de Estadística e Informática, Caracas, 1995.

### Concluding Remarks

Caroní municipio housed 71.9 percent of life-time migrants to Bolívar as of 1990, making it the most popular district in the state. The objective of this paper was not to argue that the Guayana Program was a success in terms of the quantity of life-time migrants attracted to the area. This was already noted by Friedmann, 1969; Rodwin, 1969; and MacDonald, 1969) three decades previously. The intention of the paper was to uncover characteristics pertaining to the migrants' origin state that are helpful in predicting aggregate flows of migrants to the state of Bolívar by municipio. However, it is impossible to determine if the secondary city of Ciudad Guayana actually performed its duty as a growth pole or was a recipient of population flows that were naturally reversing from the capital region. Several studies of capital cities in Latin America noted a deconcentration in population by the 1980s (Rowland and Gordon 1996; Gilbert 1996; Vining and MacKellar 1995). Undoubtedly, some of the 175,000 life-time migrants from the northeastern states that selected Bolívar State were deflected from the capital region, thereby keeping its growth rate down. Given that a good percentage of these migrants were most likely in their prime child-bearing years, excess migrant stock was effectively diverted from the capital region. The major finding of this analysis is that distance was a predictor variable for each of the municipios reminding us that none of the districts have attained an attraction to migrants from the remainder of Venezuela that circumvents the distance variable.

Brown and Lawson (1989) found evidence of polarization reversal, in terms of human capital attributes, in Venezuela as early as 1971. Their study consisted of an

analysis of eight urban districts and Venezuela as a whole. Even though net migration still favored the major urban regions there was a shift in human resource endowments from the capital region to more peripheral locales. As far as Ciudad Guayana is concerned, it was found that immigrants were not as skilled as out-migrants from the city but that Ciudad Guayana played an important function in training individuals who later dispersed throughout the country, diffusing their human capital attributes. During the latter half of the 1980s, it would appear that Bolívar was more successful in attracting migrants from further distances which was the intended function of its major city, Ciudad Guayana, when the city was conceptualized in the 1950s. Peattie (1987) after three decades of working in Ciudad Guayana concluded that the implementation of the Guayana Plan did little to improve the lives of the majority of the migrants to the region. Although employment opportunities were provided for a few skilled technicians and professionals, the remainder of the population was unable to find adequate employment.

The present study is already a decade out of date at the completion of the analysis. The 2000 Venezuelan census is the suggested next step for an understanding of the effect of the Guayana Program on migration patterns in Venezuela. The continual decline in birth rates as well as the more balanced urban hierarchy needs further exploration as it pertains to the intensity and direction of migration flows to and from Bolívar State. It is further suggested that if migration by district is available in the 2000 census that this would be an excellent way to track immigration to Caroní District and compare it with the pattern for 1990. Unfortunately, out-migration to the states of Venezuela by municipio was not available in the 1990 census, so it was not possible to trace where out-migrants from Bolívar originated. An important question that could not be answered due to the constraints of the data was whether individuals from Caroní municipio were more or less prominent in out-migration streams than their counterparts in the remainder of Bolívar State.

To gain a fuller understanding of the impact of the Guayana Program, survey studies should also be designed. The advantage of this type of study is that it allows the researcher to tailor questions for specific purposes. For example, it is assumed that migrants to Ciudad Guayana (Caroní municipio) would mostly be motivated by economic reasons given that this frontier region lacks the amenities that are available in other Venezuelan cities. There may, however, be a number of additional reasons for migration to the region that can only be addressed by interviewing migrants. The drawback of this approach is that there could be no comparison over a long period of time due to the impossibility of interviewing migrants who have returned to the origin, moved to another state or are deceased.

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