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**Microenterprise  
Growth Dynamics in  
the Dominican  
Republic:**

**The ADEMI Case**

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# **Microenterprise Growth Dynamics in the Dominican Republic:**

## **The ADEMI Case**

by

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## **ABSTRACT**

**This paper contributes to the literature of firm behavior under dynamic circumstances. The data for this study were gathered from the database of the Asociación para el Desarrollo de Microempresas, Inc. (ADEMI), in the Dominican Republic. The objective of this study is to analyze growth patterns of microenterprises participating in the ADEMI program over time. The growth patterns studied in this analysis are measured using four performance measurements, including growth rate in employment, output, output/labor, and fixed assets.**

**Within the framework of this objective, two factors are assumed to be vital in the growth of firms. The effects of the gender of a firm's proprietor on firm performance are analyzed, as are differences in firm performance among different ADEMI industries. The data are broken down further to account for any influences that time and size may have on firm performance.**

## INTRODUCTION

The Dominican Republic, with an estimated per capita income of \$710 in 1986, is the third poorest country in the Western Hemisphere. The economy is dependent on sugar, coffee, cocoa, and minerals, all sold in export markets, which has caused the economy to be highly dependent on world commodity prices. Since 1985, the Dominican government has sought to diversify the economy by encouraging the development of tourism and nontraditional exports. These new incentives have been limited in their success because of the small economic base from which the activities were begun.

In 1985, in an attempt to reverse the continuing deterioration of the economy, the government adopted a comprehensive adjustment program that included a sharp depreciation of the Dominican currency; measures to strengthen tax collection; and adjustments in the price control system, including raising the price of gasoline. Initially, the results of the program were positive, with inflation falling by 28.4 percent in 1985, and by a further 6.5 percent in 1986. At the same time, economic growth accelerated from -3.6 percent in 1985 to 3.2 percent in 1986. Subsequent to this upswing, a large public works program was undertaken in 1986 that has since caused a contraction in the economy due to high inflation and a deteriorating balance of payments.

The private sector in the Dominican Republic plays an important role in economic activity. The import substitution strategy adhered to throughout most of the 1970s provided the opportunity for the Dominican private sector to expand in virtually all sectors of the economy. During the 1980s, the private sector employed about 85 percent of the economically active population, and private sector investment accounted for over 80 percent of gross domestic investment. Public enterprises are insignificant relative to the private sector, operating in only a few key sectors such as mining and electricity generation.

Government policy operates in a mixed fashion towards the private sector. Macroeconomic policy adopted by the government limits the ability of the private sector to operate efficiently, in spite of limited public enterprise participation. The government has recently adopted an expansionary public sector policy and has also adopted an unstable foreign exchange rate policy that have hampered private sector development. At the same time, these policies have reduced the ability of the banking system to finance private sector activities.

In response to the identification of the importance of microenterprises as a means of generating income and employment, the Asociación para el Desarrollo de Microempresas, Inc. (ADEMI) was founded in February 1983 with financial support from the Dominican private and public sectors and technical assistance from ACCION/AITEC. ADEMI is a nonprofit organization that provides short-term working capital and some fixed asset loans to microentrepreneurs. Its goals include:

- Increasing the income of Dominican microentrepreneurs;
- Creating new employment; and
- Strengthening existing jobs within the informal sector.

ADEMI's 6,000 members participate in a wide array of industries including food processing, textiles, construction materials, mechanics, and microvendors. Since its creation in 1983, the organization has

spread to 20 regions around the country. This phenomenal growth has been generated through innovative approaches to making loans, including a hands-off approach to technical assistance to the microentrepreneur. The average initial loan size ranges from \$50-\$500, depending on the firm's initial net worth and income possibilities. The average size of the ADEMI firms is 2-3 employees. There are, however, many ADEMI participants that have grown to levels beyond the traditional small enterprise size.

### HYPOTHESES AND ASSUMPTIONS

Data from a sample of ADEMI beneficiaries will be analyzed in an attempt to isolate the most important influences on firm growth patterns. Two specific issues have been identified as significantly influencing firm performance. These factors are the industry type and the gender of the firm's proprietor.

Do firms owned and operated by females perform differently from those of their male counterparts within the same industry? This study attempts to answer this questions through a series of statistical tests. The sample will be further disaggregated to control for size and time influences.<sup>1</sup>

This study hypothesizes that those firms owned and operated by women will outperform male firms in growth in efficiency.<sup>2</sup> This hypothesis is based on studies in the past, which have shown females outperforming males in their use of working capital.<sup>3</sup> Female proprietors' superior performance can be attributed to sociocultural influences, including household management responsibilities at a very early age, and the need to use profits for family necessities. It is also hypothesized that females will outperform males in all other performance measures (employment, output, and fixed assets) across smaller size distributions, while male proprietor firms will outperform female proprietor firms in larger size distributions. This expected result supports the view that women face time constraints that men do not face. These time constraints result from the greater responsibilities women assume in household activities, as well as the phenomenon of spreading risk that is evident among female income-generating activities in the Third World.<sup>4</sup>

This study will also test for significant differences in mean growth rates among industries participating in the ADEMI program. It is hypothesized that of all the different industries currently participating in the ADEMI program, textiles will outperform all others. This is based on traditional factors as well as the unique dynamics of the textile industry in the Dominican Republic. The traditional factors influencing this industry's success include the relative ease with which a microentrepreneur can enter and exit this industry, the low initial start-up costs (a sewing machine and one employee), the accessibility to the industry by both sexes, and the high demand that exists for basic clothing. Favorable

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<sup>1</sup> Performance of firms across time is believed to be strongly influenced by macroeconomic factors such as inflation, monetary and fiscal policy, and industry cycles. Performance of firms across size distributions depends more on microeconomic firm management decisions.

<sup>2</sup> Efficiency, in the context of this analysis, is measured by the ratio of output (sales) to labor.

<sup>3</sup> Specifically, Mayra Buvinic, Marguerite Berger, and Cecelia Jaramillo, *Impact of a Credit Project for Women and Men Microentrepreneurs in Quito, Ecuador* (West Hartford, CT: Kumarian Press Inc., 1989), pp. 244-246.

<sup>4</sup> Buvinic, et al. (1989); Downing (1990); Otero (1987).

factors unique to the Dominican Republic center around the Free Trade Zone, which provides an excellent outlet for much of the production in this sector.

Four performance measures are used to test the above hypotheses. These measurements are listed below.

1. Compounded annual growth rate in employment. This variable is measured as the growth in number of full-time paid employees from the date of the first application made to ADEMI to the date of the latest application made to ADEMI.
2. Compounded annual growth rate in output. This variable is measured as the growth in monthly sales from the date of the first application to the date of the latest application.
3. Compounded annual growth rate in output/labor (performance variable two divided by performance variable one).
4. Compounded annual growth rate in fixed assets. This variable is measured as the percentage change in fixed assets from the first loan period to the latest loan period.

#### DATA ISSUES

The data for this study were gathered from information available in ADEMI files. The information was assembled during a two-week period between March 25 and April 8, 1989. A preliminary sample was taken from the entire database of more than 6,000 active and inactive ADEMI members from all regions. Subsequently, the sample was restricted to include only active ADEMI members. This was in response to an initial review of the data that indicated that many inactive firms either were missing data or had data that was too old.

The ADEMI database consists of financial and credit information on all active and inactive member firms. The information used for analysis here includes all balance sheet and income statement items for selected firms, as of two time periods: the date of the firm's first loan application, and the most recent information, as of the last loan application submitted by the firm.

The sampling technique involved the use of a table of random numbers, and led to a selection of 605 firms. In cases where the random selection process included fewer than 30 enterprises in any one subsector, additional firms were selected (still using random selection procedures within the subsector) to bring the number in each subsector up to this level.<sup>5</sup> In all but two subsectors, the total number of cases in the sample represents at least 10 percent of the firms in the population, which is more than that normally considered necessary to provide an accurate representation of a population.<sup>6</sup>

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<sup>5</sup> In a few cases, it was not possible to obtain this number of firms per subsector, given the lack of complete data or the limited number of enterprises in the subsector.

<sup>6</sup> Hayslett, H.T. Jr., *Statistics Made Simple* (Doubleday Press, NY, London, Toronto, Sydney, Auckland, 1968).

The statistical procedure used to test for differences in means among different categories of enterprises in the sample is a t-test.<sup>7</sup>

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<sup>7</sup> The following criteria measure the degree of statistical significance:

$p \leq .005$  indicates results that are highly significant (\*\*\*);  
 $.005 < p \leq .100$  indicates results that are mildly significant (\*\*);  
 $.100 < p < .150$  indicates results that are slightly significant (\*).

## STATISTICAL RESULTS

### BACKGROUND: ENTERPRISES IN THE SAMPLE

Table 1 provides basic characteristics of the microenterprises covered in this study.

TABLE 1  
CHARACTERISTICS OF THE SAMPLE POPULATION

|                                       | Average | Range        |
|---------------------------------------|---------|--------------|
| Employment                            | 3.95    | 1 - 30       |
| In pesos dominicanos (in 1985 prices) |         |              |
| Loan Amount                           | 1,010   | 100 - 10,000 |
| Fixed Assets                          | 5,610   | 0 - 108,163  |
| Output                                | 4,243   | 264 - 62,209 |
| Number of Years with ADEMI            | 2.17    | < 1 - 6.9    |
| Number of Loans                       | 5.71    | 1 - 25       |

The average size of the sample firms is approximately four employees (including the proprietor). These firms entered ADEMI with machinery and equipment valued at an average of 5,610 pesos (\$923). This value ranges from \$0 (predominantly in the microvendor sector) to \$17,790. The average number of years the sample firms have participated in ADEMI is 2.17 years, with the oldest firm having been with ADEMI for almost seven years.<sup>2</sup> The largest number of loans taken out by a sample firm is 25, with the average number of loans at 5.71.

<sup>2</sup> Note that this measure does not refer to the age of the firm but rather to the number of years between its first and its most recent loan application to ADEMI.

**TABLE 2**  
**GROWTH PATTERNS OF THE SAMPLE POPULATION (n=489)**

|              | Average annual<br>growth rate | Range     |    |            |
|--------------|-------------------------------|-----------|----|------------|
| Employment   | 16.75%                        | (-82.35%  | to | 234.37%)   |
| Output       | 37.17%                        | (-100.00% | to | 906.95%)   |
| Output/Labor | 24.12%                        | (-90.38%  | to | 1,309.00%) |
| Fixed Assets | 27.57%                        | (-100.00% | to | 437.50%)   |

All four performance variables display positive average growth rates when measured across the entire sample population. These results indicate that output experienced the highest growth rate, followed by growth in fixed assets and growth in the efficiency measure (output per worker). Employment growth is the lowest performer among the different measures. The maximum and minimum numbers underscore the wide variation in ADEMI firm performance.

To test for differences in growth between male and female proprietor firms, the next section will further break down these data according to the gender of the entrepreneur.

### GENDER HYPOTHESIS

#### Differences in Firm Characteristics, by Gender

The results presented in Table 3 reveal that women on the average began their association with ADEMI with less capital and labor than did male firms. The average number of employees in female-owned and -operated ADEMI enterprises is 2.7, compared to male enterprises, which average 4.3 employees. The results also suggest that females, in general, are hiring more females to work in their firms than they are males. The results indicate that female employment in firms with female proprietors increased by an average of 0.9 persons per firm. The hiring of males in the female firms actually declined by 0.1 per firm.

TABLE 3

**PRINCIPAL CHARACTERISTICS OF THE SAMPLE POPULATION,  
BY GENDER OF ENTREPRENEUR**

|                           | MALE     | FEMALE | SIGNIFICANCE<br>OF DIFFERENCE |
|---------------------------|----------|--------|-------------------------------|
| Initial Employment        | 4.3      | 2.7    | ***                           |
| Change: Female Employment | .3       | .9     | ***                           |
| Change: Male Employment   | 1.3      | -.1    | ***                           |
| Initial Loan Size         | \$247    | \$183  | **                            |
| Initial Output            | \$1,904  | \$878  | ***                           |
| Initial Savings           | \$95     | \$ 67  |                               |
| Initial Fixed Assets      | \$ 2,421 | \$808  | ***                           |
| Number of Loans           | 5.9      | 5.0    | **                            |
| Years with ADEMI          | 2.2      | 1.9    | ***                           |

Note: \*\*\*  $p \leq .005$

\*\*  $.005 < p \leq .100$

\*  $.100 < p < .150$

The results also indicate that although females on average are borrowing less money initially, the number of times that they borrow is almost equal to the number of times males borrow. When these results are compared to the average number of years that females have been with ADEMI, which is approximately 23 months (as compared to 28 months for males), it can be concluded that ADEMI participants of both sexes have borrowed with approximately the same frequency, although in smaller amounts per loan over time. This pattern is typical of lower capitalized industries whose growth strategies are based on frequent injections of working capital for the purchase of semi-finished inputs or finished goods for processing or resale, rather than concentrating on capital investments.

The fact that initial fixed assets and output for female-owned firms are significantly lower than those of male firms supports the suggestion that women are, indeed, participating in the much-maligned subsistence level or light industry sector. This phenomenon is also supported by the results of Table 4 below.

**TABLE 4**  
**SECTORAL BREAKDOWN OF SAMPLE POPULATION,**  
**BY GENDER OF ENTREPRENEUR**

|                    | MALE       |       | FEMALE     |      | TOTAL      |
|--------------------|------------|-------|------------|------|------------|
|                    | No.        | %     | No.        | %    |            |
| Food Processing    | 37         | 67.3  | 18         | 32.7 | 55         |
| Crafts/Artisan     | 19         | 90.5  | 2          | 9.5  | 21         |
| Textiles           | 64         | 55.7  | 51         | 44.3 | 115        |
| Ceramics/Pottery   | 5          | 23.8  | 16         | 76.2 | 21         |
| Electrical Repairs | 17         | 100.0 | 0          | 0    | 17         |
| Carpentry          | 30         | 100.0 | 0          | 0    | 30         |
| Ironworks          | 16         | 100.0 | 0          | 3.3  | 16         |
| Printing           | 12         | 92.3  | 1          | 7.7  | 13         |
| Jewelry            | 8          | 100.0 | 0          | 0    | 8          |
| Auto Mechanics     | 17         | 100.0 | 0          | 0    | 17         |
| Refrigeration      | 18         | 100.0 | 0          | 0    | 18         |
| Tapestries         | 23         | 100.0 | 0          | 0    | 23         |
| Shoe Repair        | 29         | 96.7  | 1          | 3.3  | 30         |
| Concrete Block     | 15         | 93.8  | 1          | 6.3  | 16         |
| Retail Foods       | 14         | 70.0  | 6          | 30.0 | 20         |
| Metal Mechanics    | 17         | 100.0 | 0          | 3.5  | 17         |
| Microvendors       | 20         | 42.6  | 27         | 57.4 | 47         |
| Service Industry   | 3          | 60.0  | 2          | 40.0 | 5          |
| <b>TOTALS</b>      | <b>364</b> |       | <b>125</b> |      | <b>489</b> |

The results presented in Table 4 confirm that women's participation in ADEMI is concentrated in commercial or light manufacturing sectors. The highest percentage of ADEMI female member participation occurs in the ceramics/pottery industry, followed by microvendors, textiles, service industries, food processing, and retail food.

Why are women participating in these industries? Are they choosing to do so based on their active participation in other income-generating activities, or they forced to do so, because of lack of managerial talent or sociocultural constraints? The education levels of ADEMI participants may shed some light on these questions.

**TABLE 5**  
**BREAKDOWN OF SAMPLE POPULATION, BY EDUCATION LEVEL AND**  
**GENDER OF ENTREPRENEUR**

| EDUCATION            | <u>MALE</u> |              | <u>FEMALE</u> |              |
|----------------------|-------------|--------------|---------------|--------------|
|                      | No.         | %            | No.           | %            |
| Primary              | 20          | 14.1         | 9             | 22.0         |
| Some Secondary       | 62          | 43.7         | 15            | 36.6         |
| High School Graduate | 30          | 21.1         | 6             | 14.6         |
| University Level     | 30          | 21.1         | 11            | 26.8         |
| <b>TOTALS</b>        | <b>142</b>  | <b>100.0</b> | <b>41</b>     | <b>100.0</b> |

If a courageous assumption can be made that higher levels of education are positively correlated with managerial talent or expertise, the ADEMI data would suggest that managerial talent is not an issue for female ADEMI participants. The results of Table 5 indicate that female ADEMI members tend to have similar education levels compared to their male counterparts. In spite of a higher percentage of females than males with only primary education, a higher percentage of ADEMI females also have a university education. Perhaps the most interesting result is that some of these university-level women are working as microvendors. Assuming that these women are telling the truth when they fill out their initial applications, the results support the hypothesis that women's participation in the service sectors may be made by choice because of time constraints placed on them from household management activities or other income-generating activities.

If women are choosing to participate in these sectors, a further breakdown of the ADEMI sample may reveal differences in the method by which they are choosing to grow. If differences in growth are observed when data are broken down by size, the implication may be that "micro" influences are significantly different between sexes; that is, women are choosing to grow differently due to different constraints. If differences are found to exist within different time intervals, the implications may be more "macro" related, signifying that economic conditions are affecting the firms in a different fashion.

#### **Growth Patterns, by Sector and by Gender**

Table 6 presents mean growth rates for selected ADEMI industries. The selection of these industries was based on the active participation level of women, as shown in Table 4. The table also indicates whether the difference in growth rates between male-owned and female-owned firms is statistically significant.

TABLE 6

**MEAN GROWTH RATES OF SAMPLE POPULATION:  
SELECTED SECTORS WITH SIGNIFICANT FEMALE OWNERSHIP,  
BY GENDER OF ENTREPRENEUR**

**MEAN GROWTH RATES**

|                        | EMPLOYMENT             | OUTPUT                  | OUTPUT/LABOR        | FIXED ASSETS |
|------------------------|------------------------|-------------------------|---------------------|--------------|
| <b>Food Processing</b> |                        |                         |                     |              |
| Male                   | 12.50                  | 18.14                   | 7.82                | 26.14        |
| Female                 | 20.85                  | 28.15                   | 10.67               | 14.61        |
| Signif.                | n.s.                   | n.s.                    | n.s.                | n.s.         |
| <b>Textiles</b>        |                        |                         |                     |              |
| Male                   | 28.50                  | 54.03                   | 25.02               | 38.43        |
| Female                 | 13.35                  | 56.14                   | 47.16               | 11.35        |
| Signif.                | ***                    | n.s.                    | *                   | ***          |
| <b>Ceramics</b>        |                        |                         |                     |              |
| Male                   | 54.59                  | 17.86                   | -15.72              | 17.06        |
| Female                 | 9.75                   | 29.49                   | 24.62               | 16.05        |
| Signif.                | *                      | n.s.                    | **                  | n.s.         |
| <b>Microvendors</b>    |                        |                         |                     |              |
| Male                   | 15.68                  | 49.16                   | 33.53               | -0.3215      |
| Female                 | 14.86                  | 42.11                   | 29.76               | 31.56        |
| Signif.                | n.s.                   | n.s.                    | n.s.                | n.s.         |
| <b>Note:</b>           | *** $p \leq .005$      | ** $.005 < p \leq .100$ | * $.100 < p < .150$ |              |
|                        | n.s. = not significant |                         |                     |              |

The results for the food processing and the microvendor sectors show no significant differences in mean growth rates between male- and female-owned firms. In the textile industry, growth rates in employment and fixed assets between males and females display highly significant differences, with males outperforming females in these two performance variables. The level of significance in output per worker displays slightly significant differences for growth in favor of female firms. The same is true in the ceramics industry, in which females outperform men in efficiency while employment growth is substantially greater for males than for females in this same industry.

These results suggest that, among sectors with substantial female participation among ADEMI borrowers, male-owned enterprises in the textiles industry are growing at significantly faster rates than firms owned by females. The slightly significant results in the ceramics industry suggest that in this industry as well, employment among firms owned by males is growing more rapidly than in female-

owned firms. The fact that females seem to outperform males in efficiency in the ceramics industry would warrant further testing to control for the size distribution of firms. Given that the measurement of efficiency is a ratio, controlling for the size of the denominator will isolate the importance of the numerator in growth measurement. This information is presented for textile producers in Table 7.<sup>9</sup>

**TABLE 7**  
**MEAN GROWTH RATES IN TEXTILE INDUSTRY,**  
**BY GENDER OF ENTREPRENEUR AND INITIAL FIRM SIZE**

|   | MEAN GROWTH RATES |        |              |              |
|---|-------------------|--------|--------------|--------------|
|   | EMPLOYMENT        | OUTPUT | OUTPUT/LABOR | FIXED ASSETS |
| <b>Initial employment less than or equal to 2<sup>a</sup></b>               |                   |        |              |              |
| Males   | 37.38             | 41.56  | 10.58        | 38.86        |
| Females   | 19.48             | 59.22  | 43.61        | 0.896        |
| Signif.   | *                 | n.s.   | **           | **           |
| <b>Initial employment great than 2, less than or equal to 6<sup>b</sup></b> |                   |        |              |              |
| Males   | -0.254            | 62.79  | 67.95        | 17.77        |
| Females   | 17.23             | 67.44  | 41.10        | 35.27        |
| Signif.   | **                | n.s.   | n.s.         | n.s.         |
| <b>Initial employment greater than 6<sup>c</sup></b>                        |                   |        |              |              |
| Males   | 27.97             | 61.21  | 31.85        | 45.40        |
| Females   | 5.50              | 8.36   | 9.82         | 75.69        |
| Signif  | n.s.              | *      | n.s.         | n.s.         |

<sup>a</sup> n = 31 males, 34 females

<sup>b</sup> n = 13 males, 24 females

<sup>c</sup> n = 9 males, 4 females

Note: \*\*\*  $p \leq .005$

\*\*  $.005 < p \leq .100$

\*  $.100 < p < .150$

These figures suggest that the significantly higher growth rate in employment as well as in fixed assets for textile firms (see Table 6) is most characteristic of (and statistically significant for) the very

<sup>9</sup> For food processing and microvending, the other two industries with substantial concentrations of female ownership, disaggregation by size of the enterprise continues to show no statistically significant differences in growth rates between male-owned and female-owned enterprises. For the ceramics industry, all producers were in the size class of 2-6 workers.

small firms. In the case of the efficiency measure as well, the superior performance is characteristic only of the small firms.

### **Observations on Gender-Related Issues**

For both the food processing and the microvendor sectors, there are no significant differences in growth patterns between male and female firms. In relation to the initial hypothesis, this may indicate that managerial skill levels in these two industries may be comparable.

The findings from the textile industry indicate that, in that industry, males seem to enter into a growth mode at smaller sizes than do females. The data reveal that in the smallest-sized distribution, males are hiring at a much faster rate than females. This large increase in hiring by male proprietor firms is affecting their efficiency, as evidenced by the superior performance of females in output/labor in this size category. Males are also increasing their investment in capital in the industry at the same time that they are hiring.

In the medium-sized textiles firms, the most significant growth differences show females outperforming males in employment growth. Although the data suggest that females seem to enter into a growth mode in this larger size, they do not tend to increase their capitalization at a rate superior to males, as shown by the insignificant results in growth rates of fixed assets. This apparent reluctance to invest in machinery and equipment on the part of ADEMI women may be related to their hypothesized time constraints. Investments in machinery imply greater commitment to a firm's growth and success. Perhaps women are not prepared to make this commitment.

In the larger-sized categories, significantly different results occur in growth rates in output between males and females. Males outperform females by a wide margin in this size distribution. This suggests that the strategy for growth that males undertake (that is, increases in investment when the enterprise is very small) is resulting in comparatively higher growth in sales (output). The women's growth strategy (that is, hire more labor at larger sizes), occurring in a more advanced stage of the enterprise's life, generates lower output results.

An analysis was undertaken to examine differences in growth patterns between male- versus female-owned enterprises according to the length of time between their first and their most recent loan from ADEMI; the analysis found no significant differences in mean growth rates. This suggests that time with ADEMI is not a relevant factor in gender differentiation of growth rates. It indicates a similarity in growth patterns over time and across gender, suggesting that macroeconomic policy affects firms of both genders in a similar fashion.

## HYPOTHESIS ON TYPE OF INDUSTRY AND GROWTH PATTERN

This section will present an overview of the industrial structure and growth patterns among enterprises in the sample of ADEMI enterprises. The focus of the analysis is to determine which ADEMI industries display the most dynamic patterns, and to analyze some of the reasons why this pattern exists. Given this general objective, it is hypothesized that textiles is the most dynamic industry because of special market conditions in the Dominican Republic, and for traditional accessibility reasons.

### Industrial Structure

Table 8 displays the mean initial levels of output, employment, and fixed assets across ADEMI industries. The subsector with the lowest initial employment level is the microvendedor sector, followed by the retail food and jewelry industries. Both the retail food and microvendedor sectors also experience the lowest levels of initial fixed assets, while the jewelry industry has one of the highest initial levels of capitalization, suggesting the diversity in labor and capital use across ADEMI industries.

TABLE 8  
INITIAL MEAN LEVELS OF OUTPUT, EMPLOYMENT,  
AND FIXED ASSETS FOR ALL SAMPLE ENTERPRISES, BY SECTOR

| SECTOR             | OUTPUT | EMPLOYMENT | FIXED<br>ASSETS |
|--------------------|--------|------------|-----------------|
| Food Processing    | 5,936  | 4.00       | 4,059           |
| Crafts/Artisan     | 4,426  | 5.05       | 3,611           |
| Textiles           | 2,533  | 3.29       | 2,577           |
| Ceramic/Pottery    | 2,339  | 3.48       | 5,863           |
| Electrical Repairs | 1,624  | 3.53       | 2,842           |
| Carpentry          | 3,754  | 4.76       | 5,958           |
| Ironworks          | 3,837  | 4.69       | 6,753           |
| Printing           | 8,093  | 5.67       | 30,047          |
| Jewelry            | 6,587  | 2.87       | 14,956          |
| Auto Mechanics     | 4,891  | 6.12       | 13,974          |
| Refrigeration      | 3,022  | 3.50       | 4,061           |
| Tapestries         | 6,110  | 5.05       | 4,701           |
| Shoemaking         | 7,008  | 5.80       | 9,245           |
| Concrete           | 4,866  | 4.75       | 5,679           |
| Retail Food        | 3,143  | 2.20       | 569             |
| Metal Mechanics    | 11,322 | 5.59       | 16,261          |
| Microvendedors     | 2,137  | 1.96       | 829             |
| Service Industries | 4,071  | 3.60       | 13,094          |

The subsector with the highest initial employment level is the auto mechanics industry, followed by shoemaking and repair, and the printing subsector. All three of these industries also have relatively high initial quantities of fixed assets.

### Growth Rates, by Industrial Sector

The highest growth rate in employment is in the service industries, which include a wide range of activities from hair salons to medical clinics. This comparatively high percentage increase should be regarded with caution, considering the small number of these industries represented in the sample (only 1 percent of the population). Among the larger sectors, the highest-performing industries in employment growth are auto mechanics, ironworks, textiles, and the ceramic and pottery industry. Both the ceramics and textile firms have active female participation.

TABLE 9

MEAN GROWTH RATES IN EMPLOYMENT, OUTPUT, OUTPUT/LABOR,  
AND FIXED ASSETS FOR ALL SAMPLE ENTERPRISES, BY SECTOR  
(in % per annum)

| INDUSTRY           | EMPLOYMENT | OUTPUT | OUTPUT/<br>LABOR | FIXED<br>ASSETS |
|--------------------|------------|--------|------------------|-----------------|
| Food Processing    | 15.12      | 21.41  | 8.72             | 22.68           |
| Crafts/Artisan     | 8.11       | 25.06  | 15.03            | 53.04           |
| Textiles           | 21.78      | 54.96  | 34.84            | 26.83           |
| Ceramic/Pottery    | 20.95      | 26.72  | 14.54            | 16.29           |
| Electrical Repairs | 19.43      | 38.83  | 20.47            | 50.69           |
| Carpentry          | 12.50      | 32.56  | 24.66            | 32.06           |
| Ironworks          | 22.48      | 31.56  | 9.55             | 25.70           |
| Printing           | 15.57      | 27.88  | 14.59            | 27.94           |
| Jewelry            | 12.75      | 47.27  | 42.58            | 17.19           |
| Auto Mechanics     | 22.43      | 32.86  | 11.68            | 17.09           |
| Refrigeration      | 13.17      | 10.97  | 2.34             | 13.90           |
| Tapestries         | 19.21      | 35.21  | 22.33            | 28.87           |
| Shoemaking         | 9.40       | 14.27  | 5.71             | 12.79           |
| Concrete Block     | -4.06      | 41.10  | 95.53            | 16.22           |
| Retail Food        | 13.63      | 66.70  | 39.67            | 72.53           |
| Metal Mechanics    | 16.01      | 19.35  | 10.67            | 30.37           |
| Microvendors       | 15.20      | 45.11  | 31.36            | 16.14           |
| Service Industries | 66.66      | 54.17  | -3.81            | 75.52           |

Although the above results reveal interesting relationships, an analysis controlling for time and size permits one to draw more carefully differentiated conclusions on the comparative performance of different sectors. The remainder of this section will present this analysis.

### Sectoral Growth Patterns: Disaggregation by Time

This section presents statistical findings relating performance (measured by growth rates of the four performance variables) with the length of time between the first and the most recent loan received by the enterprise. The objective is to compare the textile industry's growth performance with that of other sectors, using loan periods as a proxy for firm "ages." In the following discussion, the time between the first and the most recent loan received by the enterprise is referred to as its age.

TABLE 10

#### MEAN GROWTH RATES IN OUTPUT, BY SECTOR AND AGE<sup>10</sup>

| INDUSTRY           | 1 YEAR<br>OR LESS | 1 TO 3<br>YEARS | 3 YEARS<br>OR GREATER |
|--------------------|-------------------|-----------------|-----------------------|
| Food Processing    | 30.80*<br>(**)    | 22.38*          | 10.19<br>(**)         |
| Crafts/Artisan     | 40.23             | 39.64***        | 11.55***              |
| Textiles           | 74.09***          | 53.59<br>(*)    | 19.13***<br>(*)       |
| Ceramics           | 43.93             | 19.62           | 22.70                 |
| Electrical Repairs | 54.48             | 43.53           | 7.14                  |
| Carpentry          | 31.08             | 34.63           | 30.67                 |
| Ironworks          | 59.54             | 18.12           | 25.19                 |
| Printing           | 53.85***          | 11.36***        | 3.32***               |
| Jewelry            | 136.18            | 17.23           | 0.00                  |
| Auto Mechanics     | 36.63             | 41.26           | 13.69                 |
| Refrigeration      | 1.90              | 16.47           | 11.26                 |
| Tapestries         | 49.93             | 47.05***        | 18.11***              |
| Shoe Repairs       | 15.38             | 20.49***        | 5.92***               |
| Concrete Blocks    | 0.99              | 59.69           | 0.00                  |
| Retail Food        | 18.50             | 108.30          | 6.72                  |
| Metal Mechanics    | -10.00*           | 50.40*          | 17.35                 |
| Microvendors       | 54.03***          | 29.00***        | 0.00                  |

Note: \*\*\*  $p \leq .005$

\*\*  $.005 < p \leq .100$

\*  $.100 < p < .150$

<sup>10</sup> In Tables 10-16, stars reflecting statistical significance always appear in pairs (or triples) in a given row. Where there are pairs of stars in a particular row, this indicates that the pairs of starred figures are significantly different, with the statistical significance reflected in the number of stars. When there are three sets of stars in a row, this means that each pair among the three is significantly different.

All significant results show declines in growth rates in output over time. Specifically, the younger and middle-aged food processing firms reveal a decline in growth rates in output. Given the fact that all time intervals show significant declining growth patterns, it is obvious that time factors have had a strong negative effect on this industry's real sales. A similar pattern occurs in the printing industry, where all time intervals show significant differences in mean growth rates. The textile industry also declines substantially in growth rates in output, indicating that this industry is not immune to macroeconomic downturns.

TABLE 11

## MEAN GROWTH RATES IN FIXED ASSETS, BY SECTOR AND AGE

| INDUSTRY           | 1 YEAR<br>OR LESS | 1 TO 3<br>YEARS | 3 YEARS<br>OR GREATER |
|--------------------|-------------------|-----------------|-----------------------|
| Food Processing    | 24.31             | 29.66           | 8.56                  |
| Crafts/Artisan     | 2.33              | 181.05***       | 13.09***              |
| Textiles           | 16.85             | 34.79           | 29.05                 |
| Ceramics/Pottery   | 2.05**            | 3.98            | 33.78***              |
| Electrical Repairs | 44.00             | 76.98           | 14.70                 |
| Carpentry          | 28.74             | 42.10           | 1.88                  |
| Ironworks          | 34.74             | 25.17           | 20.91                 |
| Printing           | 62.78             | -10.56          | 1.53                  |
| Jewelry            | 0.00              | 26.10           | 0.00                  |
| Auto Mechanics     | 9.75              | 21.40           | 23.47                 |
| Refrigeration      | -9.90             | 23.86           | 21.78                 |
| Tapestries         | 20.28             | 34.06           | 30.40                 |
| Shoe Repairs       | -1.57***          | 22.34***        | 12.81                 |
| Concrete Block     | -22.83            | 30.48           | 0.00                  |
| Retail Food        | 52.60             | 94.44           | 23.77                 |
| Metal Mechanics    | -22.30**          | 73.81**         | 41.42**               |
| Microvendors       | 21.13             | 2.81            | 0.00                  |

Note: \*\*\*  $p \leq .005$

\*\*  $.005 < p \leq .100$

\*  $.100 < p < .150$

For the crafts, shoe repair, and metal mechanics industries, fixed assets grew significantly more rapidly during the one-to-three-year time phase. The ceramics industry displayed a significant increase in fixed assets among firms with three or more years of age.

TABLE 12

MEAN GROWTH RATES IN OUTPUT/LABOR,  
BY SECTOR AND AGE

| INDUSTRY           | 1 YEAR<br>OR LESS | 1 TO 3<br>YEARS | 3 YEARS<br>OR GREATER |
|--------------------|-------------------|-----------------|-----------------------|
| Food Processing    | 20.60**<br>(*)    | 5.13**          | -3.37<br>(*)          |
| Crafts/Artisan     | 10.83             | 38.23***        | 6.40***               |
| Textiles           | 43.93             | 36.85***        | 11.35***              |
| Ceramics           | 22.24             | 29.53           | .27                   |
| Electrical Repairs | 9.10              | 43.23           | -2.28                 |
| Carpentry          | 43.86*            | 11.21*          | 5.94                  |
| Ironworks          | 27.00**           | 6.48**<br>(*)   | 1.76<br>(*)           |
| Printing           | 28.82***          | 0.00            | -9.92***              |
| Jewelry            | 136.18            | 5.79            | 0.00                  |
| Auto Mechanics     | 17.50             | 8.51            | 6.26                  |
| Refrigeration      | -21.26*           | 20.90*          | -3.76                 |
| Tapestries         | 49.25             | 21.61           | 9.38                  |
| Shoe Repairs       | 5.33              | 7.23***         | 4.17***               |
| Concrete Block     | -2.77             | 141.29          | 0.00                  |
| Retail Food        | 4.87*             | 67.80*          | 6.72                  |
| Metal Mechanics    | -9.37             | 29.41           | 8.24                  |
| Microvendors       | 39.13**           | 18.15**         | 0.00                  |

Note: \*\*\*  $p \leq .005$ \*\*  $.005 < p \leq .100$ \*  $.100 < p < .150$ 

With the exception of one industrial group (retail food, with marginal statistical significance), Table 12 again reveals that efficiency gains decline over time, for all statistically significant differences.

### Observations

The analysis suggests that time with ADEMI displays a negative relationship with output and efficiency variables. A different pattern was found for growth rates in fixed assets, which generally peaked during the middle period, then substantially dropped for the longer loan periods. This suggests that after the first year of participation, ADEMI allows members to borrow greater sums for the purchase of capital equipment. The importance of the ADEMI policy is underscored by this apparent spurt in growth of fixed assets for the middle-aged firms. The data indicate that the immediate impact of this capitalization is not positive. This is reflected in the declining rates of growth of output and of efficiency

for firms that have been with ADEMI for a longer period. Although these rates remain positive, they seem to be strongly affected by inflation and economic cycles. The patterns found to occur over time suggest that inflation and macro policy significantly affect the performance levels of ADEMI firms.

The performance of the textile industry when controlling for time factors reveals that time with ADEMI has generally been negatively related to performance in the industry. This is shown by the declines in rates of growth of output and levels of efficiency over time. Both employment growth and growth rates in fixed assets showed no significant differences over time, indicating the minimal role that the macro policy environment has had on investment activities in this sector. In relation to other industries, the mixed nature of the results makes it difficult to conclude that this industry is superior to others.

### Industry Growth Patterns Across Size Distribution

This section details the results found when mean growth rates are measured within ADEMI industries across different size distributions of firms. The discussion looks in turn at rates of growth of employment, output, output per worker, and fixed assets, all by size of the enterprise.

TABLE 13  
GROWTH RATES IN EMPLOYMENT WITHIN  
INDUSTRIES OF DIFFERENT INITIAL EMPLOYMENT LEVELS

| INDUSTRY           | LESS THAN<br>EQUAL 2 | GREATER THAN 2<br>LESS/EQUAL 6 | GREATER<br>THAN 6 |
|--------------------|----------------------|--------------------------------|-------------------|
| Food Processing    | 22.09*               | 10.09*                         | 11.22             |
| Crafts/Artisan     | 25.82*               | 6.37                           | 0.96*             |
| Textiles           | 28.02***             | 11.09***                       | 21.06             |
| Ceramics/Pottery   | 34.04                | 15.35                          | 0.00              |
| Electrical Repairs | 63.81**              | 10.69**                        | 0.00              |
| Carpentry          | 39.29*               | 10.92*                         | -12.66*           |
| Ironworks          | 0.00                 | 24.61                          | 7.63              |
| Printing           | 0.00                 | 19.14                          | 4.88              |
| Jewelry            | 12.09                | 0.00                           | 16.73             |
| Auto Mechanics     | -17.97               | 30.00                          | 13.88             |
| Refrigeration      | 8.74                 | 18.27                          | -35.45            |
| Tapestries         | 59.23                | 6.28                           | 10.25             |
| Shoe Repairs       | 3.18*                | 9.48                           | 17.85*            |
| Concrete Blocks    | -4.47                | 1.90                           | -23.56            |
| Retail Food        | 16.40                | 5.33                           | 0.00              |
| Metal Mechanics    | 0.00                 | 19.55                          | 8.26              |
| Microvendors       | 13.54                | 21.44                          | 0.00              |

Note: \*\*\*  $p \leq .005$

\*\*  $.005 < p \leq .100$

\*  $.100 < p < .150$

The significant results from Table 13 suggest an inverse relationship for growth rates in employment with size. The larger firms, with size measured by the firms' initial employment level, display lower growth rates than the smaller-sized firms. This pattern in employment growth occurs in the food processing, crafts, electrical repairs, and the carpentry industries. This pattern of declining employment growth rate as a function of initial firm size is particularly significant for the textile industry, at least among the first two size categories. The shoe repair industry displays an opposite trend, with growth rates in employment increasing with initial size of the enterprise.

TABLE 14

## GROWTH RATES IN OUTPUT WITHIN INDUSTRIES OF DIFFERENT SIZES

## INITIAL EMPLOYMENT LEVEL

| INDUSTRY           | INITIAL EMPLOYMENT LEVEL |                                |                   |
|--------------------|--------------------------|--------------------------------|-------------------|
|                    | LESS THAN<br>EQUAL 2     | GREATER THAN 2<br>LESS/EQUAL 6 | GREATER<br>THAN 6 |
| Food Processing    | 35.21***                 | 16.95***                       | -4.20***          |
| Crafts/Artisan     | 63.41                    | 19.02                          | 17.46             |
| Textiles           | 50.80                    | 65.81                          | 44.94             |
| Ceramics/Pottery   | 7.61*                    | 33.89*                         | 0.00              |
| Electrical Repairs | 41.04                    | 41.50                          | 0.00              |
| Carpentry          | 22.91                    | 32.15                          | 46.87             |
| Ironworks          | 0.00                     | 32.75                          | 23.30             |
| Printing           | 0.00                     | 27.75                          | 40.22             |
| Jewelry            | 51.22                    | 0.00                           | 19.68             |
| Auto Mechanics     | 7.88                     | 43.56***                       | 14.33***          |
| Refrigeration      | 4.63                     | 9.43                           | 56.44             |
| Tapestries         | 62.67                    | 17.19*                         | 52.74*            |
| Shoe Repair        | 25.01***                 | 5.15***                        | 12.05             |
| Concrete Blocks    | 11.03                    | 11.36                          | 170.36            |
| Retail Food        | 86.92*                   | 6.06*                          | 0.00              |
| Metal Mechanics    | 0.00                     | 17.74                          | 23.26             |
| Microvendors       | 40.76**                  | 69.03**                        | 0.00              |

Note: \*\*\*  $p \leq .005$

\*\*  $.005 < p \leq .100$

\*  $.100 < p < .150$

The tapestry, ceramics, and microvendor sectors show increasing growth rates in output as firms become larger. These results are mildly significant when the smaller-sized microvendors are compared to the medium-sized microvendors. The auto mechanics and food processing sectors display opposite trends. As they become larger, their growth rates in output decline. This pattern is most significant in

the food processing sector, which displays significantly declining growth in output across all size distributions.

**TABLE 15**  
**GROWTH RATES IN OUTPUT/LABOR WITHIN**  
**INDUSTRIES OF DIFFERENT SIZES**

| INDUSTRY           | INITIAL EMPLOYMENT LEVELS |                                |                   |
|--------------------|---------------------------|--------------------------------|-------------------|
|                    | LESS THAN<br>EQUAL 2      | GREATER THAN 2<br>LESS/EQUAL 6 | GREATER<br>THAN 6 |
| Food Processing    | 15.63***                  | 8.84***                        | -13.44            |
| Crafts/Artisan     | 28.49                     | 11.78                          | 16.31             |
| Textiles           | 27.86                     | 50.53*                         | 25.07*            |
| Ceramics/Pottery   | -12.43**                  | 26.09**                        | 0.00              |
| Electrical Repairs | -15.69***                 | 30.58***                       | 0.00              |
| Carpentry          | -7.34**                   | 23.83**                        | 69.00             |
| Ironworks          | 0.00                      | 7.97                           | 20.56             |
| Printing           | 0.00                      | 8.23                           | 33.68             |
| Jewelry            | 49.26                     | 0.00                           | 2.52              |
| Auto Mechanics     | 31.51                     | 12.69                          | -4.87             |
| Refrigeration      | -3.34                     | -6.70                          | 142.37            |
| Tapestries         | 28.53                     | 11.58                          | 41.93             |
| Shoe Repairs       | 23.30***                  | -4.19***                       | -4.87***          |
| Concrete Blocks    | 20.01                     | 10.50                          | 454.50            |
| Retail Food        | 52.30*                    | 1.76*                          | 0.00              |
| Metal Mechanics    | 0.00                      | 5.54                           | 21.96             |
| Microvendors       | 29.93                     | 43.03                          | 0.00              |

Note: \*\*\*  $p \leq .005$

\*\*  $.005 < p \leq .100$

\*  $.100 < p < .150$

Efficiency measurements for three of the industries displaying significant results show negative rates for smaller sizes, suggesting an underuse of labor. This trend occurs in the ceramics, electrical repairs, and carpentry industries, all of which initially experience negative rates of change in efficiency for the smallest enterprises, which become positive as firm size increases. An opposite trend occurs in the shoe repair, retail food, and food processing firms, all of which display higher relative growth rates in efficiency in enterprises of smaller sizes than in larger sizes.

TABLE 16

**GROWTH RATES IN FIXED ASSETS WITHIN  
INDUSTRIES OF DIFFERENT SIZES**

| INDUSTRY           | INITIAL EMPLOYMENT LEVELS |                                |                   |
|--------------------|---------------------------|--------------------------------|-------------------|
|                    | LESS THAN<br>EQUAL 2      | GREATER THAN 2<br>LESS/EQUAL 6 | GREATER<br>THAN 6 |
| Food Processing    | 22.62                     | 13.74                          | 49.90             |
| Crafts/Artisan     | 25.75                     | 42.59                          | 103.27            |
| Textiles           | 19.58*                    | 29.43                          | 54.72*            |
| Ceramics/Pottery   | 14.12                     | 16.83                          | 0.00              |
| Electrical Repairs | 32.57                     | 28.70                          | 0.00              |
| Carpentry          | 1.87*                     | 36.51*                         | 40.00             |
| Ironworks          | 0.00                      | 23.87                          | 38.55             |
| Printing           | 0.00                      | 42.77                          | -2.93             |
| Jewelry            | 21.75                     | 0.00                           | -10.13            |
| Auto Mechanics     | 130.33                    | 24.71                          | -22.33            |
| Refrigeration      | -3.89                     | 8.98                           | 149.09            |
| Tapestries         | -12.09**                  | 24.69***                       | 85.64             |
| Shoe Repairs       | 11.06                     | 7.07                           | 23.04             |
| Concrete Block     | -1.48                     | -21.55                         | 159.76            |
| Retail Food        | 89.20                     | 35.84                          | 0.00              |
| Metal Mechanics    | 0.00                      | 13.06                          | 71.90             |
| Microvendors       | 19.13                     | 8.61                           | 0.00              |

Note: \*\*\*  $p \leq .005$

\*\*  $.005 < p \leq .100$

\*  $.100 < p < .150$

All significant results from Table 16 show significant increases in the growth rates of fixed assets with size of the enterprise.

### Observations

The analysis of growth rates within ADEMI firms of different sizes reveals that employment growth rates generally display an inverse relationship with size, while the growth rate of fixed assets is positively related to enterprise size, suggesting that, as firms grow, capital begins to replace labor as a factor of production. Both output and efficiency measurements display mixed results depending on the industry; while some industries seem to be reaching a degree of economies of scale, others do not.

## **CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH**

### **GENDER ISSUES**

The statistical results of this study show that when firm growth rates are analyzed by different size distributions, smaller, male-owned firms in the textile industry outperform female-owned firms in growth of employment and in fixed assets by a wide margin. The fact that output per worker tends to be the women's most positive growth feature when compared to men suggests a different growth strategy taken by female entrepreneurs, compared to males. A continual increase in sales suggests that, when given access to credit, women are purchasing their needed inputs, whether they are semifinished garments, or (in the case of microvendors and food processors) finished goods for resale. Profits from the sale of these goods may not all be reinvested in the business (as shown by the declining growth rate in fixed assets of female-owned firms), but are probably spent on other necessities such as goods for the home or children's educations. Some of these funds are reinvested, as evidenced by the increase in employment growth of female-owned firms in the textile industry in the middle-sized category.

The most interesting results of the gender analysis occur in the middle-sized categories in the ceramic and textile industries. Growth rates in employment show negative rates for men, while women display robust growth rates. Women also outperform men in the traditionally female-dominated ceramic industry in employment growth by a ratio of 3:1. Larger-sized, female-owned firms in the garment industry displayed a significantly lower growth rate in output than those owned by males.

Given the evidence and the initial hypotheses of gender performance as they relate to time and size, policy implications are that micro-related actions to encourage women to adopt more economically efficient growth strategies should be stressed. This micro argument is based on the finding that macro factors tend to affect firms of both genders in the same way; hence public policy cannot easily target gender-specific firms. It is believed, however, that because ADEMI is inextricably associated with these firms, ADEMI policy could substantially help in better defining the significance of these apparently different strategies undertaken by men and women. It is not clear whether these strategies need to be altered or not, but the evidence from this study would indicate that women are not reaching the growth potential that they could reach under a different set of circumstances.

ADEMI has provided Dominican women with an opportunity to overcome traditional obstacles to credit that in the past prevented women from borrowing. The recognition by the organization that small, informal businesses are creditworthy, and ADEMI's flexible policy for interest rates, repayment schedules, and loan amounts, have allowed the traditional micro businesses of women to gain access to credit. The female ADEMI participants seem to have taken advantage of this credit accessibility, as shown by their growth rates in some industries. Yet with these advantages, women's enterprises seem to be performing well only in employment and output; they do not seem to be investing in equipment or machinery purchases for their industries. The data suggest that their preferred growth strategy is to hire more labor. This pattern also occurs once their firms are larger, as opposed to males who hire more labor as well as increase their fixed assets at smaller sizes. These results tend to support the argument that women's other income-generating activities and household duties may be forcing them to adapt a different growth strategy than men, with the results being significantly lower output levels as their firms become larger.

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## INDUSTRY ISSUES

The analysis of industries entailed a two-step process across time periods and across different size distributions. The objective was to determine industry growth while controlling for time factors, which are external in nature and generally beyond the control of the individual proprietor, and size factors, which are assumed to be internal and have a greater relationship to managerial decisions and actions within a firm. Within the framework of time and size, it was also hypothesized that because of traditional and sociocultural particularities, the textiles industry would be the most dynamic, as measured by the four performance variables.

The results of this analysis proved inconclusive in relation to the specific textiles hypothesis. It was found that while textiles certainly display good performance over time and size in relation to other ADEMI industries, in several instances the declines in growth have been substantially greater than in other industries. A brief description of the results and conclusions for selected industries follows.

### Textiles

Growth rates in output and efficiency declined with the age of the enterprise in this industry. Time does not seem to have any significant effect on growth rates of employment and fixed assets, suggesting that the external policy does not seem to affect the investment potential in the industry. Growth rates in employment decline in firms of all sizes while growth rates in fixed assets increase as firm size rises. This pattern suggests that these ADEMI industries are growing and experiencing a period of adjustment as they begin a process of capitalization over time and as they become larger. The data indicate that employment growth rates decline with age and enterprise size, a natural consequence of the industry's transition from a labor-intensive to a more capital-intensive base.

This industry's dependence on the Free Trade Zones seems to work in its favor as seen in its growth patterns. Although inflation has affected the real value of overall sales, it has not affected investment. The industry seems to be experiencing a continually strong demand for its goods as its increasing mechanization confirms.

### Tapestries

This industry over time displays an inverse relationship between output and time, suggesting that inflation has reduced the industry's effective demand. Growth rates in output increase substantially for firms of all sizes in this industry, as do growth rates in fixed assets. This result points to an industry reaching higher economies of scale.

The positive results for firms of all sizes may suggest the existence of a linkage between this industry and the clothing manufacturers. Since both industries use similar inputs in their production, it is not surprising to find that they display similar growth patterns. The major differences between these two industries is the target consumer.

### **Carpentry, Electrical Repairs**

These industries are grouped together based on their relationship to the construction industry. Both carpentry and electrical repairs are highly dependent on imports for raw materials. Over time, carpentry displays an increase in employment growth rates, suggesting a positive effect of government programs on the construction industry. Both industries display negative growth rates in efficiency at smaller sizes, and positive, robust growth rates in efficiency as they become larger, suggesting the approach of economies of scale.

These results suggest that both industries have benefited substantially from the government building boom over the past five years. Public works projects are being implemented in the colonial sections of Santo Domingo where renovations are under way on many of the old colonial monuments for the celebration of 500 years since America's discovery, and in some of the poorer sections of the city where massive project-like buildings are taking the place of corrugated steel houses.

The dependence of these industries on public expenditure could be dangerous, especially considering that the large increases in expenditure of the government have not been accompanied by matching growth rates in revenue.

### **Shoe Repair**

The effects of increases in time and size are negatively related to growth in output and efficiency in this industry. Firms that have only participated in ADEMI for a short time have experienced positive growth rates. As the loan periods become longer, both output and efficiency decline to negative rates, while fixed assets increase. Over the size distribution, efficiency rates for the larger firms are negative, suggesting that although the industry seems to be in transition from a labor to a capital base, other factors are contributing to its diseconomies of scale. This industry also has an outlet in the Free Trade Zone, although the positive effects of this seem to be less than in the textile industry.

### **Food Processing**

This light industry displays mixed results over time and size. Although an inverse relationship exists between time and growth rates in output and efficiency, firms with the longest growth periods continue to display positive growth rates in performance. When this industry's success is measured across the size distribution, a different result occurs. The smaller enterprises experience healthy growth rates in output and efficiency. Larger firms display diseconomies as shown by negative growth rates in these same variables.

### **Microvendors**

This poverty-level industry proved to be remarkably successful. Growth rates in output and efficiency for these firms are healthy when related to other industries in similar time categories. These results were significant only for the two shorter periods, suggesting a degree of transience in the sector. Perhaps the most interesting result was that over the size distribution, the microvendors show increasing growth rates in output. For the middle-sized firm categories, this subsector performed better than all others in growth rate in output.

### **TOPICS FOR FURTHER RESEARCH**

The analyses and conclusions presented in this study only scratch the surface of the information that could be obtained from the ADEMI organization. Currently, ADEMI has in its possession documentation of firms that have been withdrawn from the organization for a number of financial as well as political reasons. This archive of information could be a vital source for any future studies relating firm mortality to its age and initial size. Regional studies relating growth patterns across ADEMI firms by region could also be analyzed, given the enormous quantity of information in the regional offices. Although ADEMI does not serve rural areas, the implications of Free Trade Zones could be further studied as they relate to ADEMI firms' growth rates.

The results of the gender analysis could be further substantiated by interviews with ADEMI female participants to determine whether the hypothesized time and activity constraints are important factors in determining their growth strategies.

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