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RATE VARY ACROSS COUNTRIES AND  
OVER TIME?**

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and David S Evans



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## ABSTRACT

### Why Does the Self-Employment Rate Vary Across Countries and Over Time?\*

There is a tremendous diversity in the level and time-series pattern of the self-employment rate across countries. After documenting this fact with cross-section and time-series data on industrialized and lesser-developed countries, this paper presents and tests a series of hypotheses concerning the sources of this diversity. We show that the major explanation for this diversity is the stage of economic development. While the tendency for the self-employment rate to decline with economic development has long been recognized, this paper is the first attempt to estimate the statistical relationship between self-employment and economic development and to test an explanation for this relationship that is grounded in theory. We also show that the negative relationship between self-employment and economic development remains after controlling for a number of other factors. Although economic development is an extremely powerful force behind the secular decline in self-employment rates, the convergence of several factors in the 1970s tended to stem the secular decline in the self-employment rate for many countries. Of the 23 OECD countries we examined, 15 had increases in the self-employment rate during the 1970s or 1980s. It is likely, however, that these factors are temporary and that self-employment will continue its downwards trend as per-capita wealth increases in the developed and developing world.

JEL classification: J0, L0

Keywords: self-employment, economic development, unemployment

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Figure B23



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## NON-TECHNICAL SUMMARY

For over a century there has been a trend in economic activity, exhibited in virtually every developed industrialized nation, away from small firms and towards large vertically-hierarchical organizations. It was therefore particularly striking when a series of studies recently identified that this trend had not only ceased sometime during the mid-1970s, but had actually begun to reverse itself. That is, the empirical evidence clearly showed that the firm-size distribution in developed countries began to shift away from larger corporations and towards smaller enterprises.

An important aspect of the trend away from larger businesses, at least in the United States, is the increase in the share of the labour force accounted for by self-employed workers, or what has been defined as the self-employment rate. Self-employed individuals include all sole proprietors, members of partnerships, and (depending upon the particular definition being used) owners of small incorporated businesses. They constitute the vast majority of those individuals who own and control their own businesses, thereby conforming to the definition Frank Knight proposed in 1921 of an entrepreneur.

Despite a burgeoning literature on the determinants of self-employment and entrepreneurship, there has been little research examining whether the increase in the self-employment rate is unique to the United States. The purpose of this paper is, first, to identify how the self-employment rate has varied with respect to variations over time and across a wide range of nations; and, second, use several recent theories to try to explain why self-employment rates vary across countries and over time.

Our study finds that the United States is not the only country to experience an upturn in the self-employment rate. Many OECD countries also exhibited an increase in self-employment beginning in the mid-1970s and, in some cases, earlier. Intriguingly, however, many other OECD nations – among them Austria and France – experienced a more or less steady decrease in the self-employment rate throughout the 1970s and 1980s. Lesser Developed Countries (LDCs) for which we were able to obtain data show a similar pattern. One group of LDCs exhibits a continual decrease in the self-employment rate between 1966 and 1984, but another exhibits a decrease until the mid 1970s and an increase thereafter.

Previous research has also not considered why different countries have such dramatically different self-employment rates. Within the 23 member countries of the OECD, the self-employment rate ranges from a low of 5.5% in Austria to a high of 17.1% in Italy. Such high variation in self-employment rates also exists

Figure B22

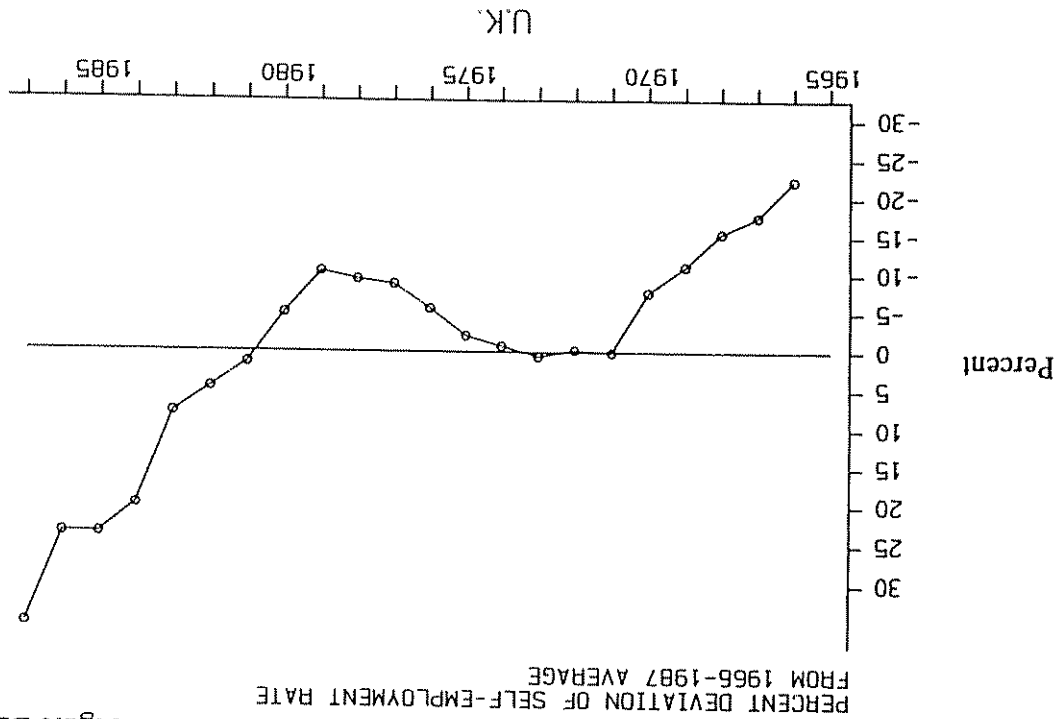
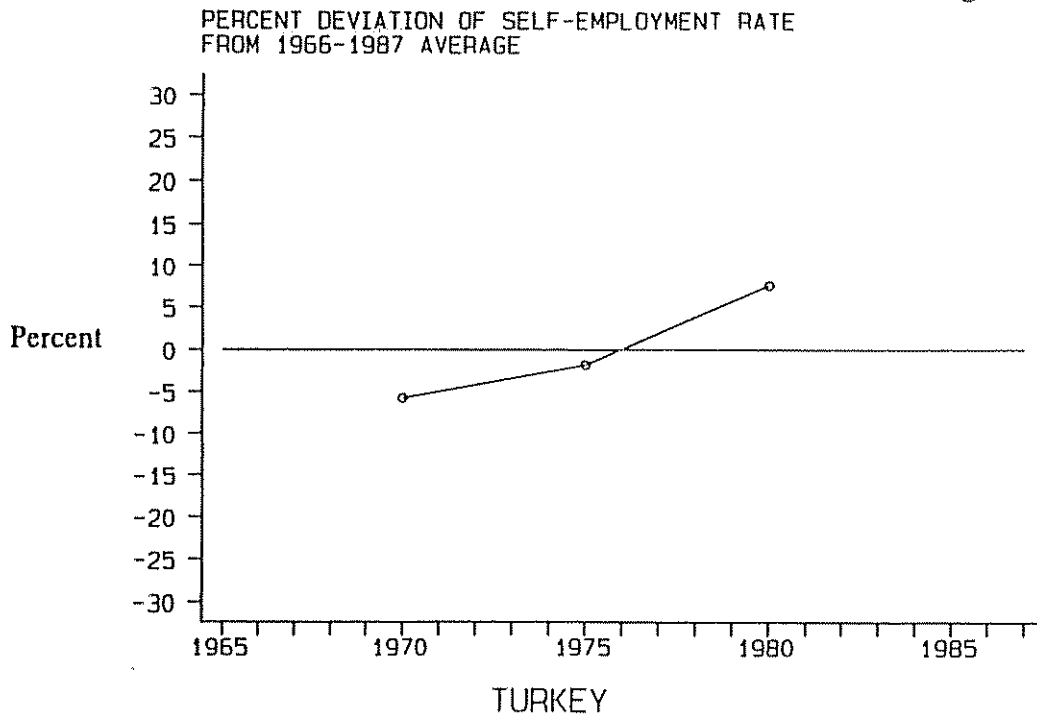


Figure B21



across LDCs. Botswana had the lowest self-employment rate at 3.1%, while Nepal had the highest at 86.2%.

These cross-national differences in the level and time-series of the self-employment rate are important and relevant for public policy for at least two reasons. First, self-employment is an important aspect of both labour and industrial market organization. Worldwide, 130 million individuals are self-employed, excluding those engaged in agriculture. Almost one in ten members of the labour force is self-employed in the OECD countries. Cross-national differences in self-employment imply cross-national differences in labour and industrial markets. Second, cross-national differences in the time-series of self-employment may provide clues as to why the trend towards lower self-employment ceased and even reversed itself in many of the industrialized countries during the 1970s.

We find that a major explanation for the tremendous diversity in the self-employment rate across countries and over time is the stage of economic development. The evidence suggests that as economies become more capital intensive, optimal firm size increases, thereby leading to a decrease in the returns to entrepreneurship relative to wages earned from working in an incumbent corporation. It is the emergence of other factors, such as the shift away from manufacturing towards services and an increase in unemployment rates in the 1970s, that has more than offset increases in economic development, however, and resulted in the observed increase in self-employment in many OECD countries. We do conclude that self-employment will, most likely, continue its long-term downwards trend as per-capita wealth increases in the developed and lesser-developed countries.

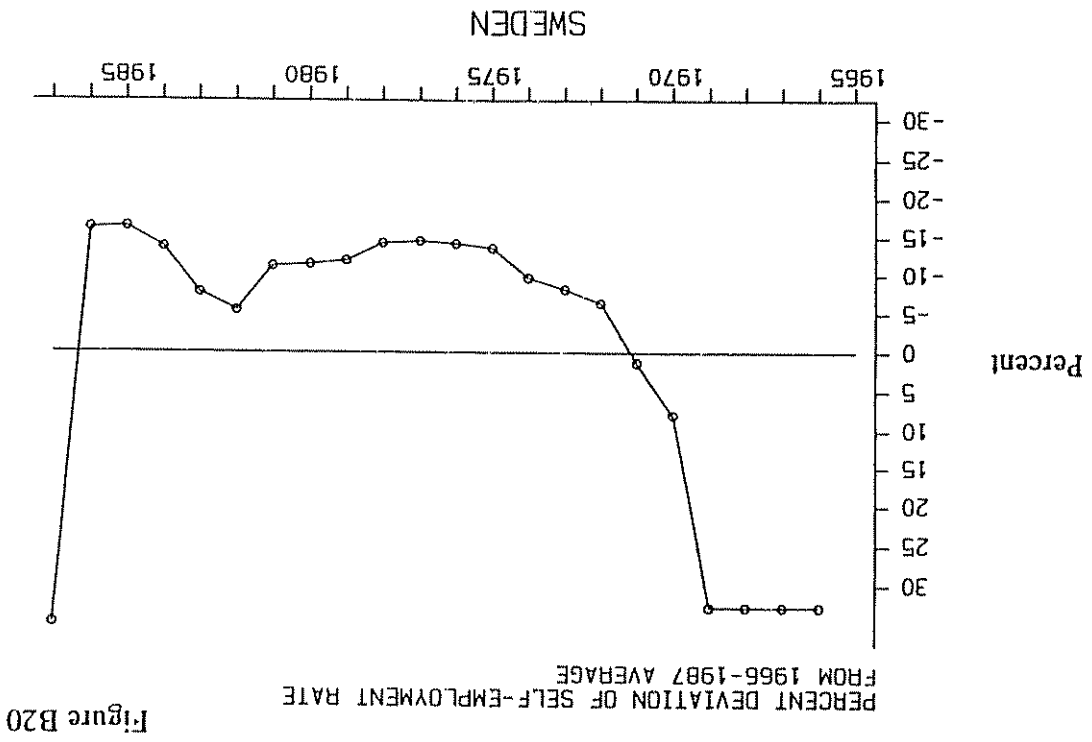




Figure B19



## 1. INTRODUCTION

Several lines of research have found that something happened to the centuries-old trend towards larger businesses: depending upon the measure of business size examined, the trend decelerated, ceased, or reversed itself sometime between the late 1960's and late 1970's. Brock and Evans (1989) show that gross national product per firm increased from 1947 to 1980 but then decreased between 1980 and 1986. Brown, Medoff, and Hamilton (1990) observe that in the U.S. the small firm share of employment declined in every major sector between 1958 and 1977, while between 1976 and 1986 the small-firm share of employment increased in the goods producing sectors of the economy and decreased in the non-goods producing sectors. Davis (1990) shows that the typical non-farm private-sector employee worked at increasingly larger establishments during the 1950's and 1960's but at increasingly smaller establishments in the later 1960's and 1970's. Sengenberger, Loveman, and Piore (1991) report that average firm and establishment size began to decrease in most of the countries they examined in the 1970's after having increased from at least the end of World War II. The causes of the cessation and possible reversal of the trend towards larger businesses is, as described in Brock and Evans (1989), an active area of research.

An important aspect of the trend away from larger businesses, at least in the United States, is the increase in the percent of the labor force that is self-employed (i.e. the self-employment rate). Self-employed individuals include all sole proprietors, members of partnerships, and (depending upon the particular definition being used) owners of small incorporated businesses. They constitute the vast majority of those individuals, in the United States, who own and control their own businesses and who are therefore entrepreneurs by Knight's (1921) definition.

Blaug (1987) and Evans and Leighton (1989) show that the self-employment rate decreased from at least the end of World War II until the early 1970's and then increased at least until the mid-

1980's. Blau attributes this reversal to technological change and changes in marginal tax rates that favor self-employment. Evans and Leighton argue that changes in the demographic makeup of the workforce and in the sectoral composition of demand can explain most of the time series evidence.

Despite a burgeoning literature on the determinants of self-employment and entrepreneurship,<sup>1</sup> there has been little research into whether the increase in the self-employment rate is unique to the United States.<sup>2</sup> It turns out that it is not: many of the countries that belong to the Organization of Economic Cooperation and Development (OECD) had an increase in self-employment beginning in the mid-1970's and, in some cases, earlier. Intriguingly, however, many other OECD countries—among them France and Austria—experienced a more or less steady decrease in the self-employment rate throughout the 1970's and 1980's. Lesser Developed Countries (LDCs) for which we were able to obtain data show similar patterns. There are two major groups of LDCs: those that had a continual decrease in the self-employment rate from 1966 to 1984 and those that had a decrease until the mid 1970's and an increase thereafter.

Existing research has also not examined why different countries have such dramatically different self-employment rates.<sup>3</sup> Within the 23 member countries of the OECD,<sup>4</sup> the self-

<sup>1</sup>Recent major papers include Borjas and Bronars (1989), Evans and Leighton (1989a, 1989b), Evans and Jovanovic (1989), Blanchflower and Oswald (1990), Meyer (1990), Blanchflower and Meyer (1991), Bogenhold and Staber (1990), and Gerrit de Wit (1991).

<sup>2</sup>Blau (1987) notes that Japan, France, West Germany, and Italy had roughly the same experience as the United States. Our data, however, are not consistent with this statement.

<sup>3</sup>A major exception to this statement is Bogenhold and Staber (1990) who examine international evidence on self-employment using a framework similar to that used in this paper. We, however, examine a larger group of countries and place more emphasis on documenting and explaining differences in levels and trends across countries. (continued...)

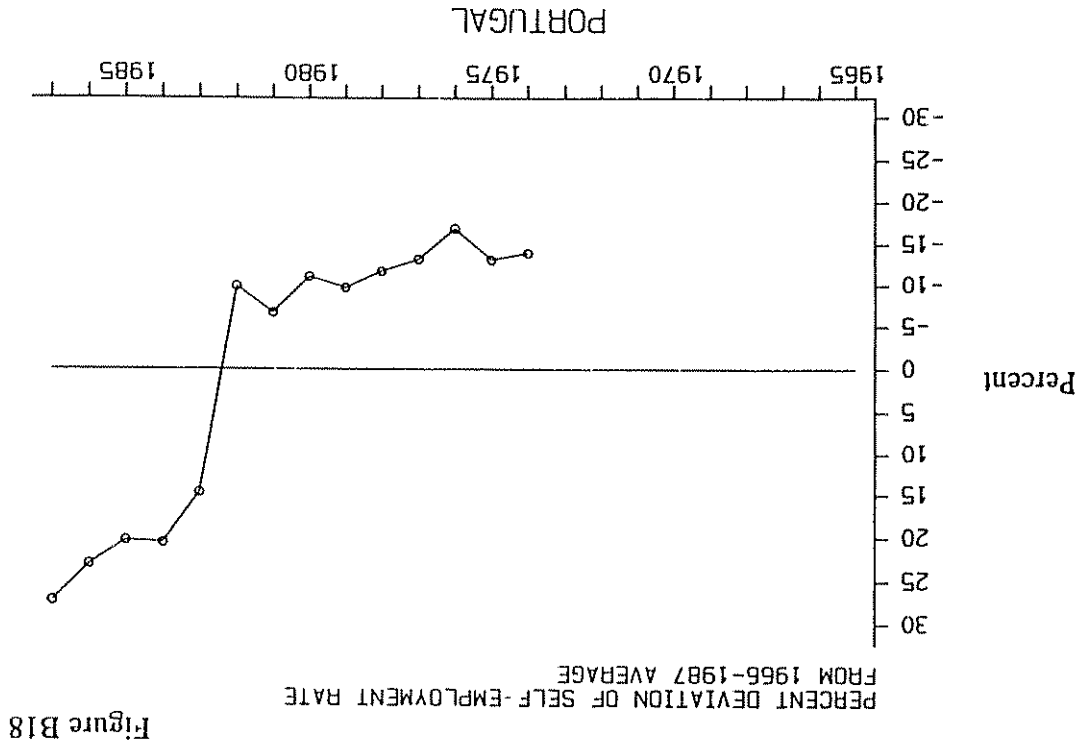
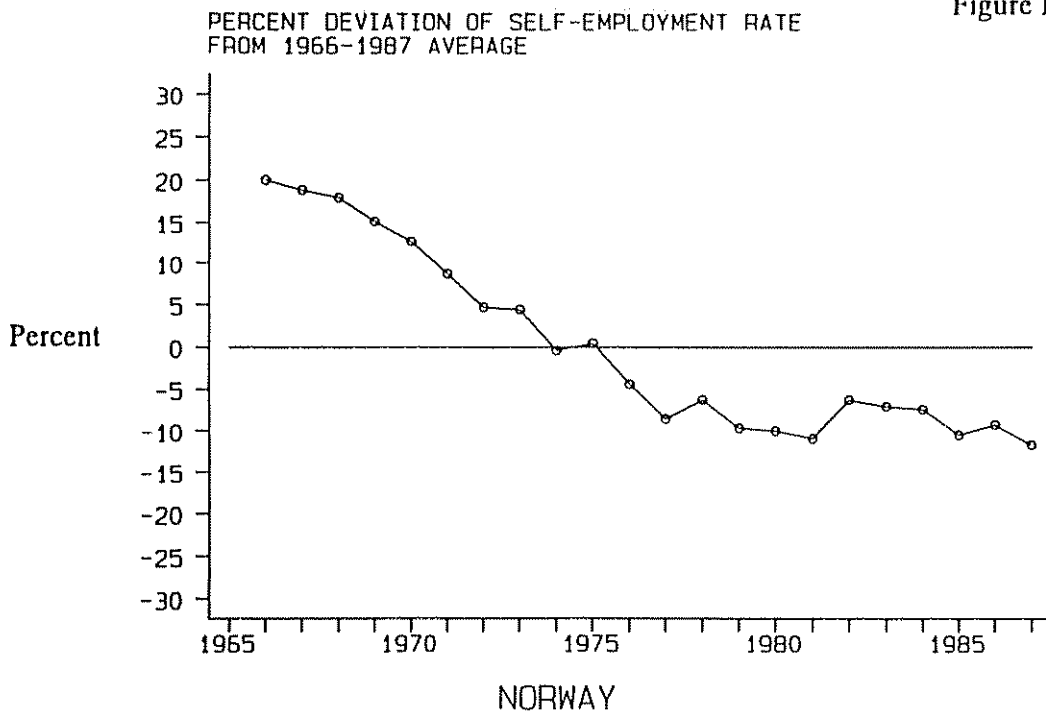


Figure B17



employment rate in 1987 varied from a low of 5.5 percent in Austria to a high of 17.1 percent in Italy. For these countries in 1987 the mean self-employment rate was 9.1 percent with a standard deviation of 3.5 percent. There is a similar variation across the LDCs. The average self-employment rate was 27.0 percent with a standard deviation of 17 percent for 29 LDC's for which we were able to obtain data for 1984 (or, in some cases, years close to 1984). In 1984, Botswana had the lowest self-employment rate—3.1 percent—while Nepal had the highest self-employment rate—86.2 percent.<sup>3</sup>

These cross-national differences in the level and time series of the self-employment rate are interesting for at least two reasons. First, self-employment is an important aspect of both labor and industrial market organization. Worldwide, 130 million individuals are self-employed excluding those engaged in agriculture.<sup>4</sup> Almost one in 10 members of the labor force is self-employed in the OECD countries. In the United States, the self-employed plus the individuals who work for the self-employed account for about 20 percent of the labor force according to Haber and Lichtenstein (1987). Of the 17.5 million non-farm businesses in the United States in 1986, 70.7 percent were organized as sole proprietorships, 9.7 percent as partnerships, and 5.7 as Sub-Chapter S corporations which are generally small corporations with one or a few owners. Thus, approximately 86.1 percent

<sup>3</sup>...continued)

Moreover, as we shall show below, the chief finding of the Bogenhold and Stuber paper—that changes in unemployment are the major causes of changes in self-employment—could result from their choice of a measure of self-employment that is, by construction, related to the unemployment rate.

<sup>4</sup>No data were available for Switzerland.

<sup>5</sup>For a comprehensive review of self-employment around the world see International Labour Office (1991), International Labour Office (1991).

of all businesses are operated by self-employed individuals in the United States.<sup>7</sup> Cross-national differences in self-employment imply cross-national differences in labor and industrial markets. There is a second reason why examining international variations in the self-employment rate is interesting. Cross-national differences in the time series of self-employment may provide clues as to why the trend towards lower self-employment ceased in many of the industrialized countries during the 1970's.

The striking differences in the time series of the self-employment rate and the level of the self-employment rate across countries are the subject of this paper. We begin by documenting international differences in the level of self-employment and historical trends in self-employment for 23 OECD countries and 33 LDCs. We review several explanations for these differences posited by us and other authors and present simple empirical tests of these explanations. We then test some of these explanations using panel data on 21OECD countries for which we were able to develop consistent time-series from 1966 to 1987.

The next section of this paper compares and contrasts self-employment in the OECD countries between 1966 and 1987 and in LDCs between selected years for which data were available. It shows that there are substantial differences in the level of and changes in self-employment across

<sup>7</sup>Data on the number of non-farm proprietorships, partnerships, and corporations are from *Statistical Abstracts 1990*, p. 521; the data are for 1986. No data were available on the number of Subchapter-S Corporations. We used data on the number of Subchapter-S Corporations from the *Census of Minority-Owned Businesses, Hispanics, 1987*, p. 90 which reports these data for comparison purposes; the data are for 1987. The figure of 86 percent is only an approximation since some non-Subchapter S corporations are operated by people who may report themselves as being self-employed. There is also no guarantee that individuals who file tax returns that imply that they have self-employment as a primary or secondary occupation identify themselves as being self-employed on Census surveys.

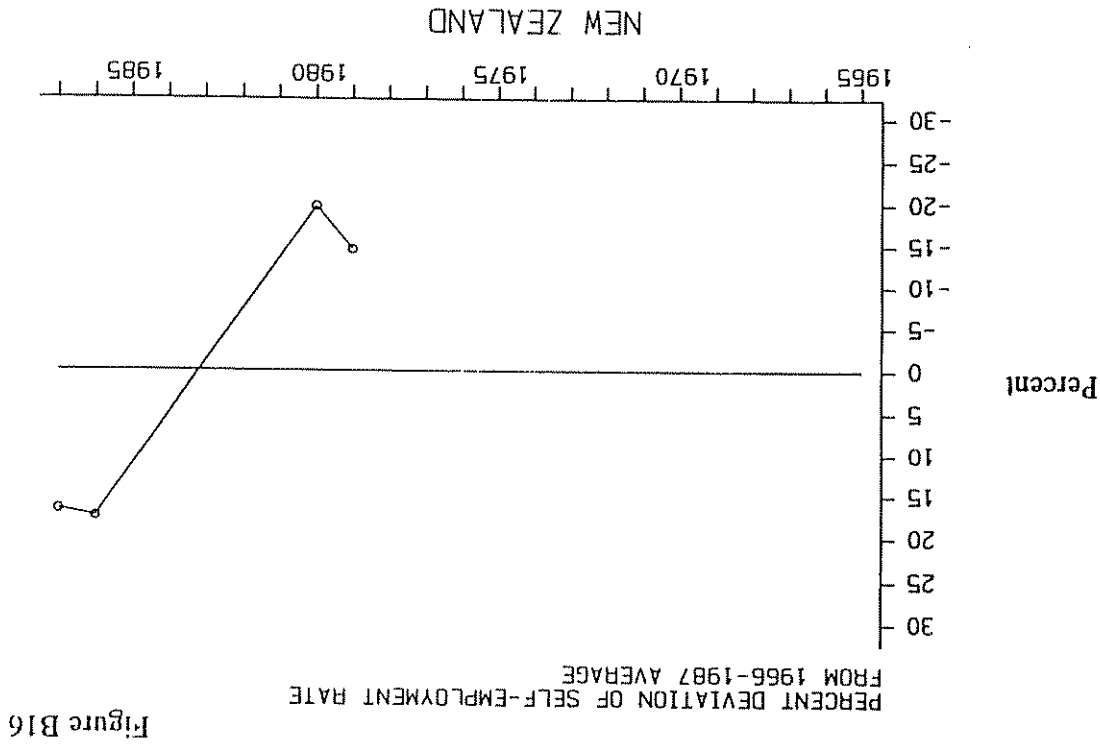


Figure B15



these countries. The third section discusses some possible explanations for these cross-sectional and time-series differences and reports some crude tests of these explanations. The fourth section presents regressions for a panel of OECD countries for which consistent time series data were available. The last section summarizes the results.

## II. INTERNATIONAL COMPARISONS OF SELF-EMPLOYMENT

We defined the rate of self-employment as the percent of the nonagricultural labor force that is working for themselves.<sup>4</sup> We calculated the self-employment rate for 1966-1987 from data obtained from the OECD's *Labor Force Statistics* and from the International Labour Organization's *Yearbook of Labour Statistics*. Data were available consistently between 1966 and 1987 for 14 OECD countries, for most of the 1970's and 1980's for another 9 OECD countries, and for a handful of years for 33 LDCs. Table 1 reports the self-employment rates for the OECD countries

<sup>4</sup>There are many possible definitions of the self-employment rate depending upon whether one includes all individuals who are self-employed on a full-time or part-time basis, whether one includes individuals who report some self-employment income, and whether one includes, for the U.S., owners of small corporations as well as sole proprietors and partners. Blau (1987) finds that several of these alternative measures are, as one would expect, highly correlated with each other. It is not possible to compare alternative definitions for the OECD countries. Therefore, we rely on the self-employment we can calculate based on OECD data: all employers plus individuals working on their own account in the nonagricultural sector divided by the labor force in the nonagricultural sector. An alternative definition would be to divide by the working labor force; that is the definition used by Bogemund and Sabher (1990). This definition is defective for studying time-series changes within and across countries because it is seriously affected by changes in the unemployment rate. Increases in the unemployment rate decrease the working labor force and increase the apparent self-employment rate.

The Percent of the Non-Agricultural Labor Force that is Self-Employed in the OECD Countries, 1966-1987

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
AUSTRALIA	9 52%	8 76%	8 35%	8 46%	8 44%	8 59%	8 41%	8 63%	9 16%	9 09%	9 82%	10 26%
BELGIUM	10 68	10 68	10 34	10 16	11 03	9 87	9 66	9 66	8 65	8 25	8 16	8 46
CANADA	10 10	10 11	9 97	9 20	8 92	8 76	8 62	8 46	8 41	8 40	8 39	8 39
DENMARK	6 77	6 55	6 13	6 08	6 03	5 82	5 44	5 50	5 10	5 33	5 59	5 59
FINLAND	5 69	5 22	5 31	4 96	5 13	5 18	5 22	4 87	4 69	4 71	4 74	4 74
FRANCE	11 23	11 45	11 25	10 91	10 54	10 26	10 03	9 84	9 66	9 51	9 34	9 18
GERMANY	7 53	7 73	7 67	7 47	7 31	7 06	7 08	6 98	6 94	6 91	6 91	6 97
GREECE	8 20	8 17	8 26	8 18	7 99	7 59	7 98	7 00	7 26	7 44	7 09	20 31
IRELAND	6 31	7 13	7 17	7 27	6 73	6 93	7 23	7 42	7 51	7 45	7 28	7 42
ITALY	18 39	18 54	18 86	18 17	18 52	17 77	17 64	17 89	17 71	17 54	14 40	14 40
JAPAN	10 98	11 44	11 42	11 60	11 49	11 68	12 03	11 88	11 65	11 71	11 79	11 79
LUXEMBOURG	11 71	11 84	11 64	11 25	11 18	10 83	10 55	10 22	9 87	9 55	9 23	9 15
NETHERLANDS	7 84	7 76	7 70	7 52	7 36	7 10	6 83	6 82	6 50	6 56	6 24	5 97
NORWAY	7 84	7 76	7 70	7 52	7 36	7 10	6 83	6 82	6 50	6 56	6 24	5 97
PORTUGAL	7 40	7 09	7 41	7 34	7 41	7 09	7 40	7 34	7 41	7 09	7 40	7 40
SPAIN	6 25	6 25	6 25	6 25	5 09	4 77	4 41	4 32	4 26	4 07	4 04	4 02
SWEDEN	6 25	6 25	6 25	6 25	5 09	4 77	4 41	4 32	4 26	4 07	4 04	4 02
TURKEY	6 25	6 25	6 25	6 25	5 09	4 77	4 41	4 32	4 26	4 07	4 04	4 02
U K	5 35	5 67	5 81	6 12	6 35	6 09	6 06	6 14	6 06	6 73	6 49	6 27
U S A	7 85	6 66	6 46	6 48	6 28	6 28	6 14	6 10	6 17	6 06	5 98	6 14
OECD (1)	9 36	9 14	9 07	9 02	8 89	8 80	8 70	8 71	8 66	8 51	8 46	8 28

[1] This row reports the self-employment rate for 17 countries for which data were available for every year. The rate is calculated as total self-employed across the 17 countries divided by total labor force across the 17 countries.

Figure B14

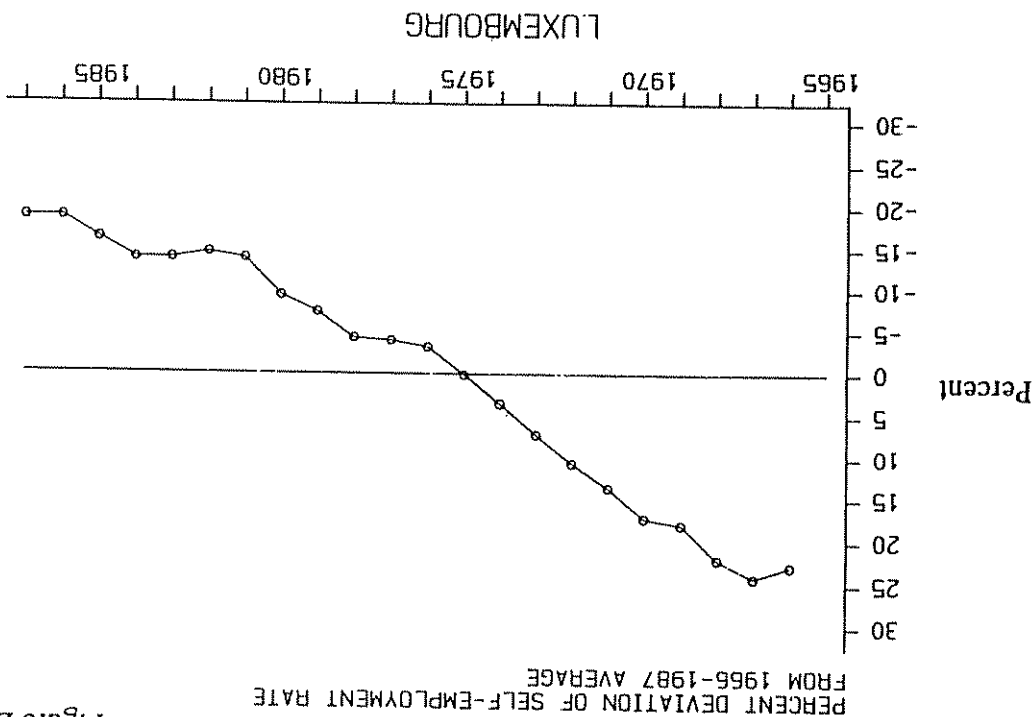


Figure B13

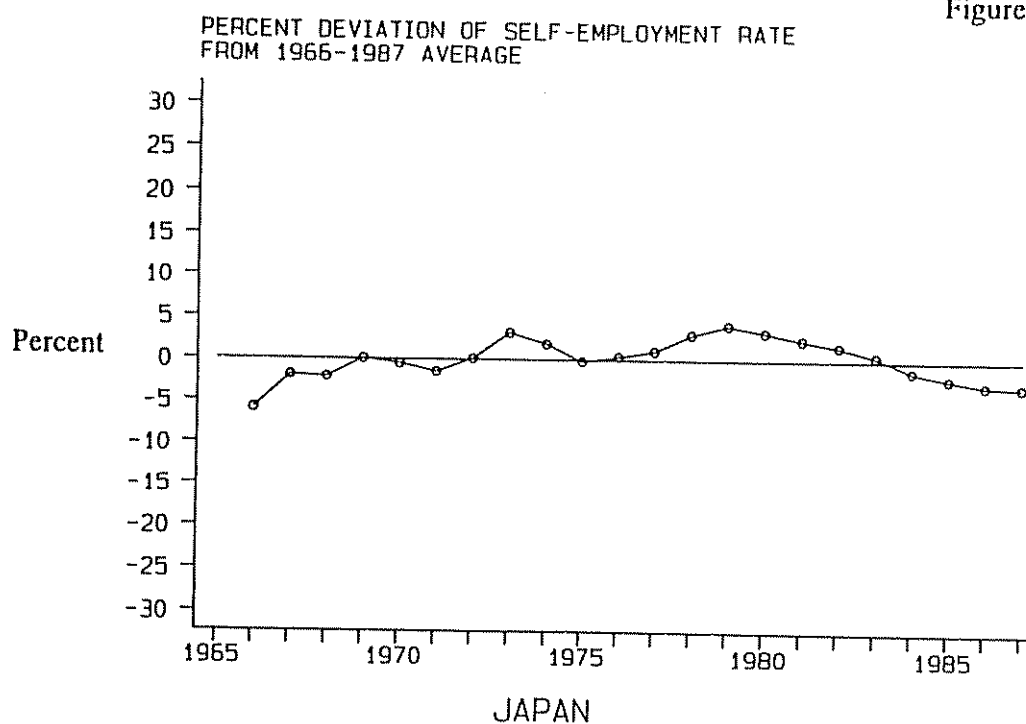


Table 1

The Percent of the Non-Agricultural Labor Force that is  
Self-Employed in the OECD Countries, 1966-1987

Country	Year										Average Over Time
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	
AUSTRALIA	10.68%	10.95%	11.21%	10.72%	10.71%	10.20%	10.67%	10.89%	10.96%	10.87%	9.79%
AUSTRIA	8.22	7.77	7.74	7.51	6.94	6.98	6.90	5.25	5.43	5.45	8.40
BELGIUM	8.42	8.37	8.36	8.36	8.33	8.35	8.53	8.66	8.83	9.02	8.85
CANADA	5.77	5.87	5.77	5.59	5.73	5.93	6.19	6.35	6.17	6.28	5.92
DENMARK	7.83	8.01	6.97	6.85	6.78	6.96	6.51	6.21	6.21	6.00	7.74
FINLAND	4.61	4.94	4.98	5.03	4.84	5.80	5.72	5.40	5.78	6.80	5.22
FRANCE	9.13	9.05	9.01	8.97	8.88	8.85	8.72	8.70	8.73	8.81	9.64
GERMANY	6.95	7.00	6.92	6.81	6.89	6.98	7.04	7.04	7.02	7.03	7.10
GREECE	21.28	21.69		18.51	18.64	17.99	17.68	17.81	18.21	18.77	19.09
ICELAND	7.26	6.03	6.12	6.01	6.19	6.37	6.77	7.14	7.25	7.25	7.22
IRELAND	7.45	7.72	7.71	7.16	7.57	7.66	8.04	8.25	7.88	8.51	7.45
ITALY	14.91	14.87	15.20	15.66	16.17	16.38	16.93	16.98	17.12	17.10	17.02
JAPAN	12.02	12.15	12.05	11.95	11.86	11.73	11.52	11.42	11.33	11.31	11.67
LUXEMBOURG	9.12	8.83	8.64	8.21	8.15	8.21	8.21	7.98	7.74	7.74	9.54
NETHERLANDS	7.81	7.84	8.08	8.20	7.73	7.18	7.25	7.08	6.98	7.20	7.64
NEW ZEALAND		8.31	7.81						11.44	11.36	9.73
NORWAY	6.12	5.89	5.87	5.81	6.12	6.06	6.04	5.84	5.92	5.76	6.53
PORTUGAL	7.53	7.69	7.58	7.95	7.68	9.77	10.28	10.25	10.49	10.85	8.52
SPAIN	11.30	11.54	11.66	11.51	11.31	11.41	11.68	11.60	11.82	12.55	11.60
SWEDEN	4.04	4.15	4.17	4.18	4.45	4.34	4.06	3.94	3.94	6.36	4.71
TURKEY			9.39								8.72
U K	6.23	6.16	6.53	6.98	7.19	7.41	8.24	8.50	8.50	9.29	6.88
U S A.	6.24	6.43	6.50	6.49	6.55	6.76	6.82	6.73	6.65	6.79	6.48
OECD [1]	8.38	8.46	8.51	8.51	8.58	8.68	8.79	8.74	8.70	8.86	

[1] This row reports the self-employment rate for 17 countries for which data were available for every year. The rate is calculated as total self-employed across the 17 countries divided by total labor force across the 17 countries.

and Table 2 for the LCD countries along with some summary statistics. The data appendix describes the sources and construction of the data in more detail.

#### A. Differences in Self-Employment Rate across Countries

Approximately 9.1 percent of the labor force in 22 OECD countries was self-employed in 1987.<sup>9</sup> This figure, however, masks dramatic differences between the individual countries. As shown in Table 1, Italy had the highest rate of self-employment—over 17 percent—while Austria had the lowest rate—less than 6 percent. The median rate of self-employment was 8.6 percent in 1987.

There is similar variation for the LDCs as shown in Table 2. We had observations on self-employment in 28 LDCs in 1984 or, in some cases, a few years before 1984. Nepal had the highest self-employment rate (86.2 percent) and Botswana the lowest (3.1 percent). The median self-employment rate was 26.4 percent. Seven countries had self-employment rates of no more than 17.1 percent and 7 countries had self-employment rates of at least 37.3 percent.

#### B. Differences in Self-Employment Trends across Countries

Figure 1 shows the total self-employment rate for 17 OECD countries between 1966 and 1987,<sup>10</sup> the rate is calculated as the ratio of total self-employed individuals divided by total individuals in the labor force across where the totals are summed across all of the countries in the sample. The figure shows that the self-employment rate for the 17 OECD countries decreased from 9.4 percent in 1966 (the peak for the period) to 8.3 percent in 1977 (the trough for the period) and

<sup>9</sup>No data were available for \_\_\_\_\_

<sup>10</sup>Complete data were not available for Denmark, Greece, The Netherlands, New Zealand, Portugal, and Turkey.

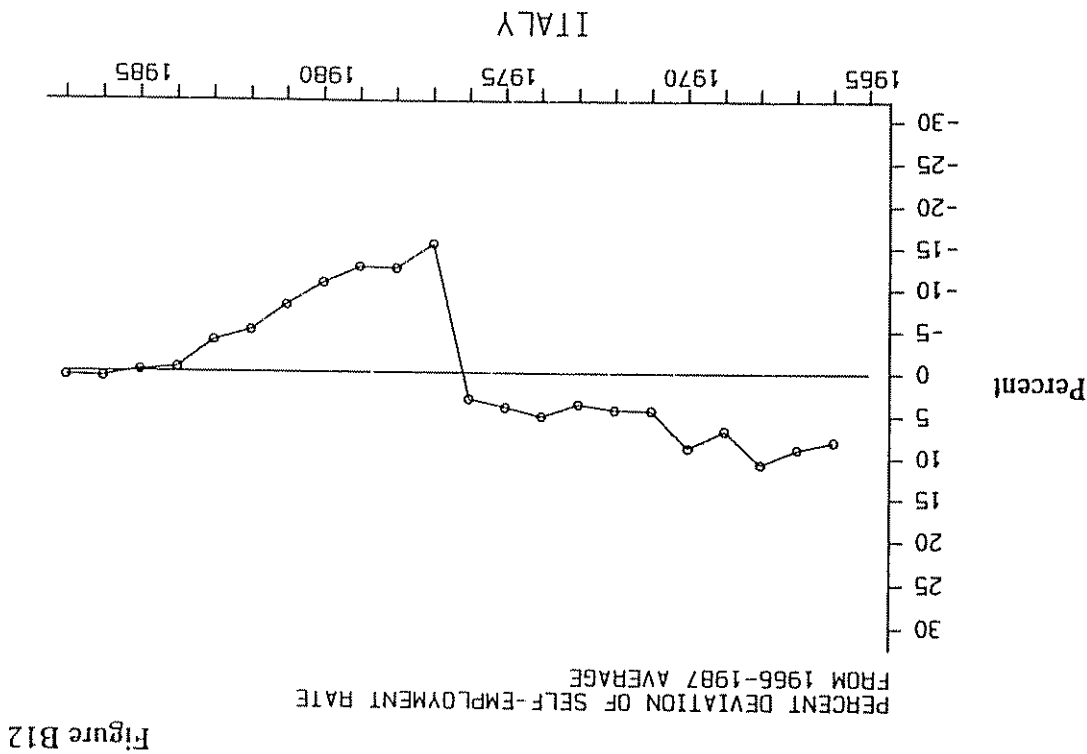




Figure B11



Country	Estimate		Actual		Self-Employment Rate
	for year	year of	Estimate	year of	
ARGENTINA	1966	1960		24.54%	
ARGENTINA	1976	1970		21.94	
ARGENTINA	1984	1980		NA	
BOTSWANA	1966	1964		8.46	
BOTSWANA	1976	1976		NA	
BOTSWANA	1984	1981		3.06	
BURUNDI	1966	1966		NA	
BURUNDI	1976	1976		NA	
BURUNDI	1984	1976		35.63	
BURUNDI	1966	1960		20.17	
CHILE	1976	1971		23.75	
CHILE	1984	1984		23.63	
CHILE	1966	1963		20.77	
COSTA RICA	1966	1973		17.09	
COSTA RICA	1976	1976		22.07	
COSTA RICA	1984	1984		31.24	
CYPRUS	1966	1960		27.30	
CYPRUS	1976	1976		NA	
CYPRUS	1984	1984		42.51	
ECUADOR	1966	1974		37.81	
ECUADOR	1976	1982		29.40	
ECUADOR	1984	1966		26.14	
EGYPT	1966	1976		26.51	
EGYPT	1976	1984		34.45	
EGYPT	1984	1964		39.12	
GUATEMALA	1966	1976		42.19	
GUATEMALA	1976	1981		43.98	
GUATEMALA	1984	1950		39.12	
HAITI	1966	1971		59.33	
HAITI	1976	1983		13.17	
HAITI	1984	1966		11.05	
HONG KONG	1976	1976		10.05	
HONG KONG	1984	1984		47.70	
HONG KONG	1966	1965		41.14	
INDONESIA	1976	1976		52.49	
INDONESIA	1984	1980		30.97	
JORDAN	1966	1961		NA	
JORDAN	1976	1976		22.76	
JORDAN	1984	1979		37.26	
KOREA, RE	1966	1966		32.64	
KOREA, RE	1976	1976			

The Percent of the Non-Agricultural Labor Force that is Self-Employed in Selected Lesser Developed Countries

Table 2

The Percent of the Non-Agricultural Labor Force that is Self-Employed in Selected Lesser Developed Countries

Country	Estimate for year	Actual year of Estimate	Self-Employment Rate
KOREA, RE	1984	1984	30.57%
KUWAIT	1966	1965	15.28
KUWAIT	1976	1975	11.88
KUWAIT	1984	1980	9.95
MALAYSIA	1966	1962	30.11
MALAYSIA	1976	1970	NA
MALAYSIA	1984	1980	28.70
MEXICO	1966	1960	34.24
MEXICO	1976	1975	31.13
MEXICO	1984	1980	27.00
MOROCCO	1966	1960	40.35
MOROCCO	1976	1971	NA
MOROCCO	1984	1982	27.08
NEPAL	1966	1961	77.05
NEPAL	1976	1976	70.21
NEPAL	1984	1981	86.23
PANAMA	1966	1960	34.37
PANAMA	1976	1970	36.25
PANAMA	1984	1984	25.59
PARAGUAY	1966	1962	48.35
PARAGUAY	1976	1972	44.34
PARAGUAY	1984	1982	43.13
PERU	1966	1961	40.40
PERU	1976	1972	41.23
PERU	1984	1982	NA
PHILIPPINES	1966	1965	37.61
PHILIPPINES	1976	1976	33.96
PHILIPPINES	1984	1983	NA
PUERTO RICO	1966	1960	12.99
PUERTO RICO	1976	1976	12.86
PUERTO RICO	1984	1984	11.81
RWANDA	1966	1966	NA
RWANDA	1976	1976	NA
RWANDA	1984	1978	42.25
SRI LANKA	1966	1963	26.94
SRI LANKA	1976	1971	23.20
SRI LANKA	1984	1981	23.70
THAILAND	1966	1960	29.84
THAILAND	1976	1975	45.19
THAILAND	1984	1984	30.16
TRINIDAD	1966	1960	19.06

Figure B10

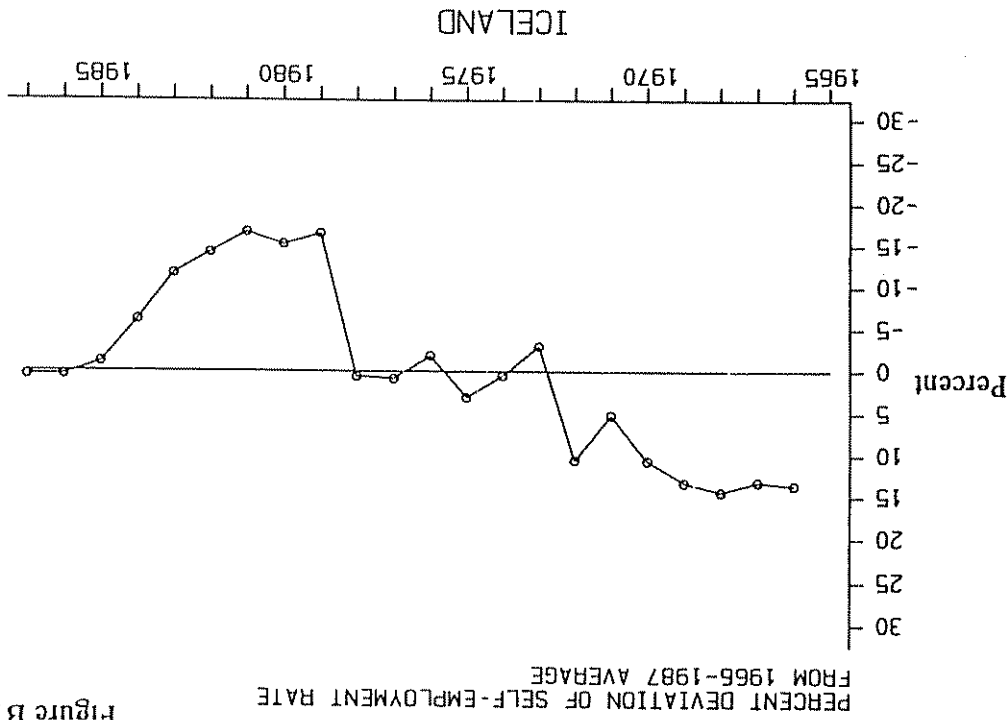
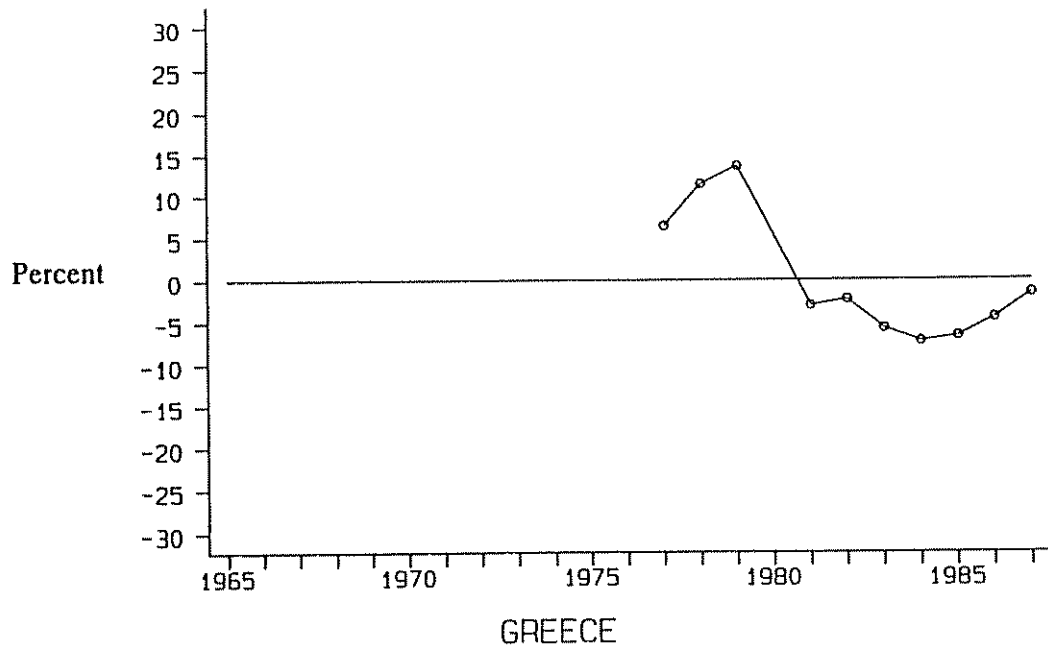


Figure B9

PERCENT DEVIATION OF SELF-EMPLOYMENT RATE  
FROM 1966-1987 AVERAGE



Country	Estimate for year	Actual year of Estimate	Self-Employment Rate
TRINIDAD	1976	1975	14.71%
TRINIDAD	1984	1983	15.35
TUNISIA	1966	1966	25.45
TUNISIA	1976	1975	25.06
TUNISIA	1984	1984	22.48
UNITED AR	1966	1966	NA
UNITED AR	1976	1975	9.04
UNITED AR	1984	1980	6.80
VENEZUELA	1966	1961	33.65
VENEZUELA	1976	1975	25.70
VENEZUELA	1984	1984	26.30
YUGOSLAVIA	1966	1961	26.61
YUGOSLAVIA	1976	1971	22.64
YUGOSLAVIA	1984	1981	17.18

The Percent of the Non-Agricultural Labor Force that is Self-Employed in Selected Lesser Developed Countries

then increased to 8.9 percent in 1987. The self-employment rate at the 1966 peak is only 12 percent larger than the 1977 trough. Thus, while self-employment declined until the mid 1970's and then increased, the magnitude of the changes are relatively small.

The time series of self-employment rates varies substantially, however, across the OECD countries included in Figure 1. As a convenient way to summarize the trends across countries we have performed the following regression for each country

$$S_y = a + by + ct_y^2/2$$

where

y = year of observation

S = percent deviation between self-employment rate in year y and the average self-employment rate over the years for which we have data

i = number of years since 1965 (ranges from 1 to 22)

The time pattern of the self-employment rate can be summarized by the estimated coefficients b and c which are reported in Table 3.<sup>11</sup> The estimated peak or trough of the series is given by  $t^* = -b/c$  so that the corresponding year of the peak or trough is  $1965 + t^*$ . We can categorize the time series into four patterns depending on b and c and whether the peak or trough lies during the time period. We have taken some liberties in classifying the countries because, in several cases, the peak or trough was so close to the endpoints of the time period that it was apparent that there had been a more or less continual increase or decrease.

<sup>11</sup>Figures B1-B23 in Appendix B report the graphs for the individual countries. A regression using the log of the self-employment rate yields similar results to those reported below.

Figure B8

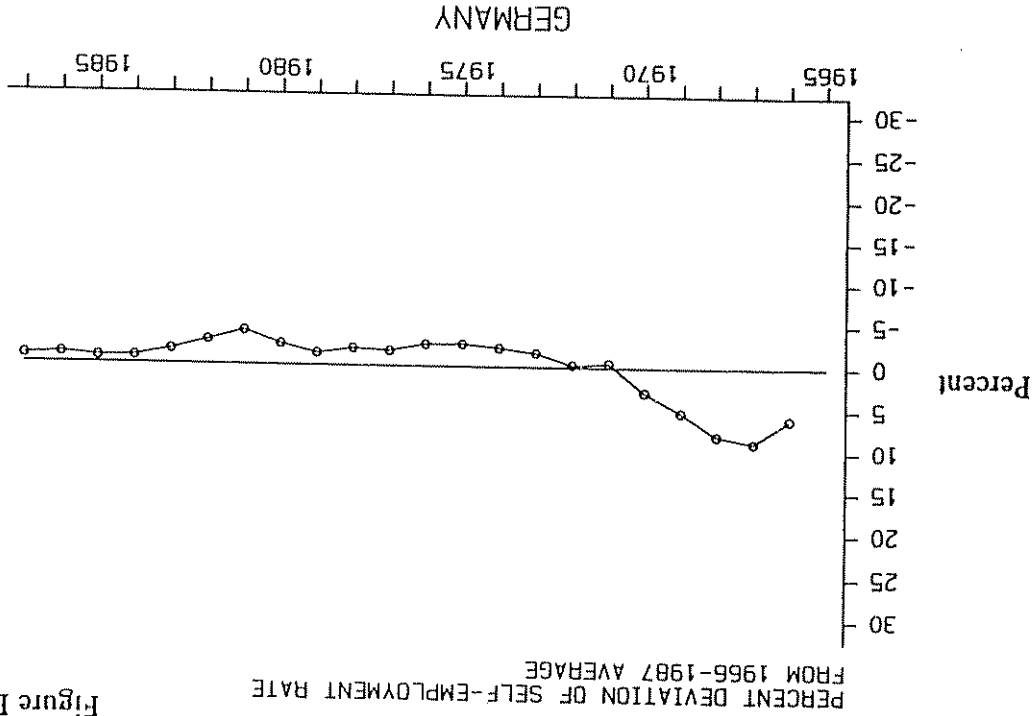


Figure B7



Figure 1

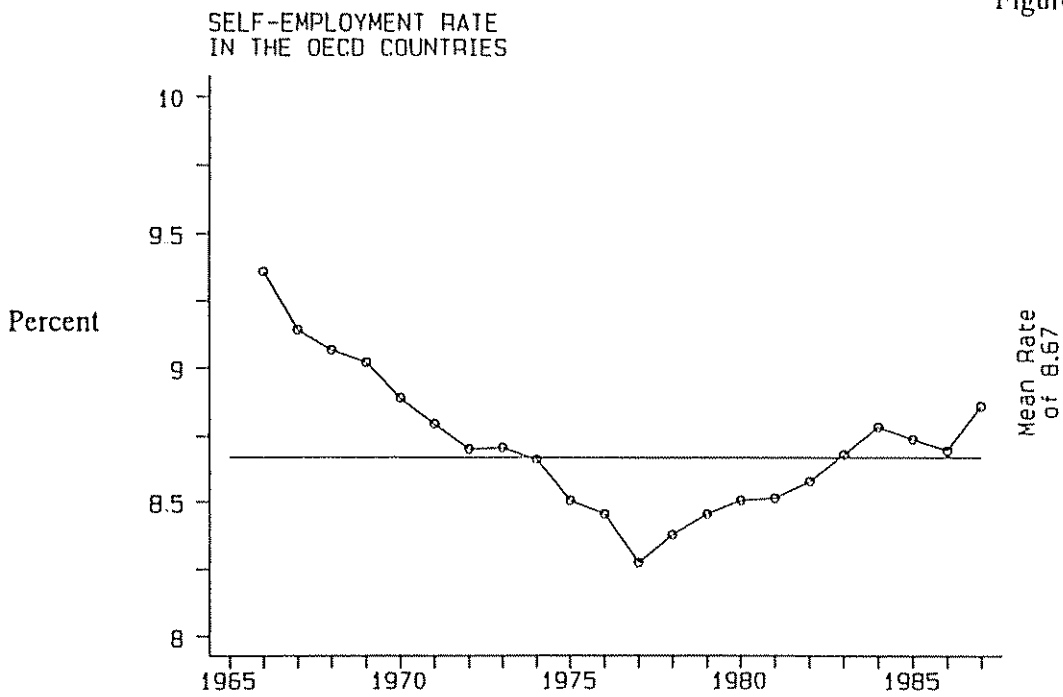


Table 3

Estimated Regression Results  
for OECD Countries [1]

Country	Estimated year of Peak or trough	Estimated Coefficient for time	Estimated Coefficient for (time <sup>2</sup> /2)
AUSTRALIA	2484	1.39	0.00
AUSTRIA	1988	-2.16	-0.09
BELGIUM	1979	-3.87	0.27
CANADA	1976	-3.90	0.33
DENMARK	2011	-3.35	0.07
FINLAND	1975	-4.30	0.42
FRANCE	1985	-3.21	0.16
GERMANY	1979	-1.82	0.12
GREECE	1985	-11.25	0.56
ICELAND	1981	-3.86	0.24
IRELAND	1978	0.45	0.03
ITALY	1979	-3.03	0.20
JAPAN	1977	1.39	-0.12
LUXEMBOURG	1997	-3.46	0.11
NETHERLANDS	1973	1.40	-0.16
NEW ZEALAND	1975	-6.30	0.61
NORWAY	1984	-3.81	0.20
PORTUGAL	1975	-7.05	0.69
SPAIN	1978	-3.38	0.24
SWEDEN	1978	-9.91	0.73
TURKEY	1968	-0.84	0.22
U.K.	1967	-0.63	0.22
U.S.A.	1976	-2.92	0.26

[1] Estimates based on ordinary least squares regression of the percent deviation of self-employment from period average against time and (time<sup>2</sup>/2), where time is measured from 1965.

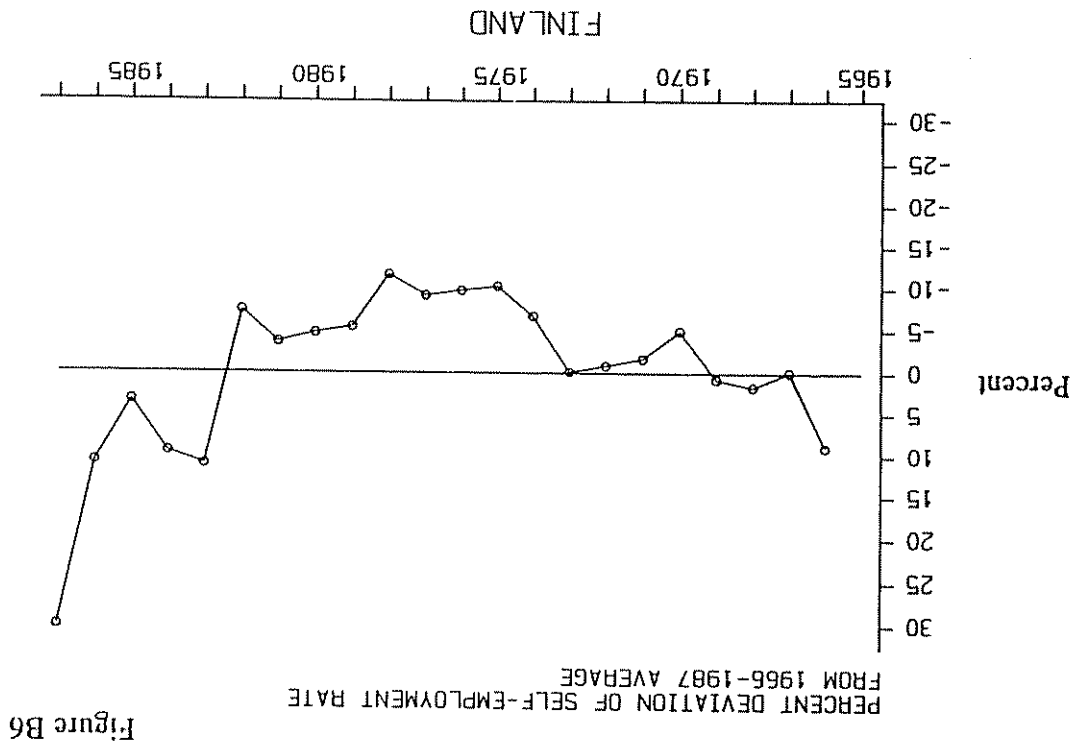
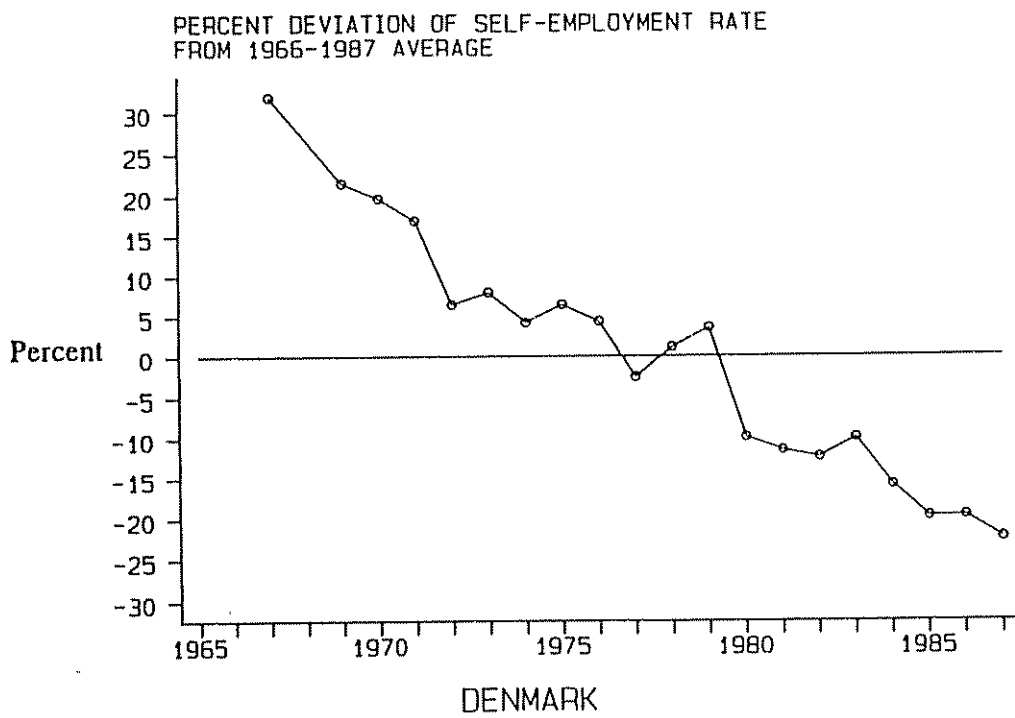


Figure B5



*Increasing Self-Employment* ( $b > 0, c > 0$ ) or ( $b > 0, c < 0, t^*$  not in the 1970's)

*Decreasing Self-Employment* ( $b < 0, c < 0$ ) or ( $b < 0, c > 0, t^*$  not in the 1970's)

*U-Shaped Self-Employment* ( $b < 0, c > 0, t^*$  in the 1970's)

*∩-Shaped Self-Employment* ( $b > 0, c < 0, t^*$  in the 1970's)

Table 4 reports the category into which each country falls.

The largest group consists of 12 countries in which the self-employment rate decreased until sometime in the 1970's and then increased. This group includes Canada, Germany, and the United States. The next largest group consists of 6 countries which had more or less continual decreases during the period we have examined. This group includes France. There are three countries in which self-employment increased more or less steadily during the period: Australia, Ireland, and the United Kingdom. Finally, self-employment increased and then decreased in Japan and the Netherlands during the period we examined.

Table 5 reports the time-series data for the LDCs. These data are spotty. For 21 countries, data were available for 1966, 1976, and 1984 or for a year that was reasonably close to these years. Table 5 reports the percent changes in the self-employment rate between 1966 and 1976, 1976 and 1984, and 1966 and 1984. On average, the self-employment rate declined in these countries between 1966 and 1984, with most of the decrease taking place between 1966 and 1976. The mean percent change was -6.3 percent between 1966 and 1976, -0.3 percent between 1976 and 1984, and -7.1 percent between 1966 and 1984. Seventeen of the countries had decreases in self-employment between 1966 and 1976 and 12 between 1976 and 1984. The largest decrease between 1966 and 1984 was in Yugoslavia (closely followed by Kuwait) while the largest increase was in Guatemala (followed by Chile).

Table 4  
Time-Series Pattern of Self-Employment in OECD Countries

<p><i>U-Shaped Pattern</i></p> <p>BELGIUM CANADA FINLAND GERMANY ICELAND ITALY NEW ZEALAND PORTUGAL SPAIN SWEDEN TURKEY U.S.A.</p>	<p><i>Continual Decrease</i></p> <p>AUSTRIA DENMARK FRANCE GREECE LUXEMBOURG NORWAY</p>
<p><i>Continual Increase</i></p> <p>AUSTRALIA IRELAND U.K.</p>	<p><i>∩-Shaped Pattern</i></p> <p>JAPAN NETHERLANDS</p>

Figure B4

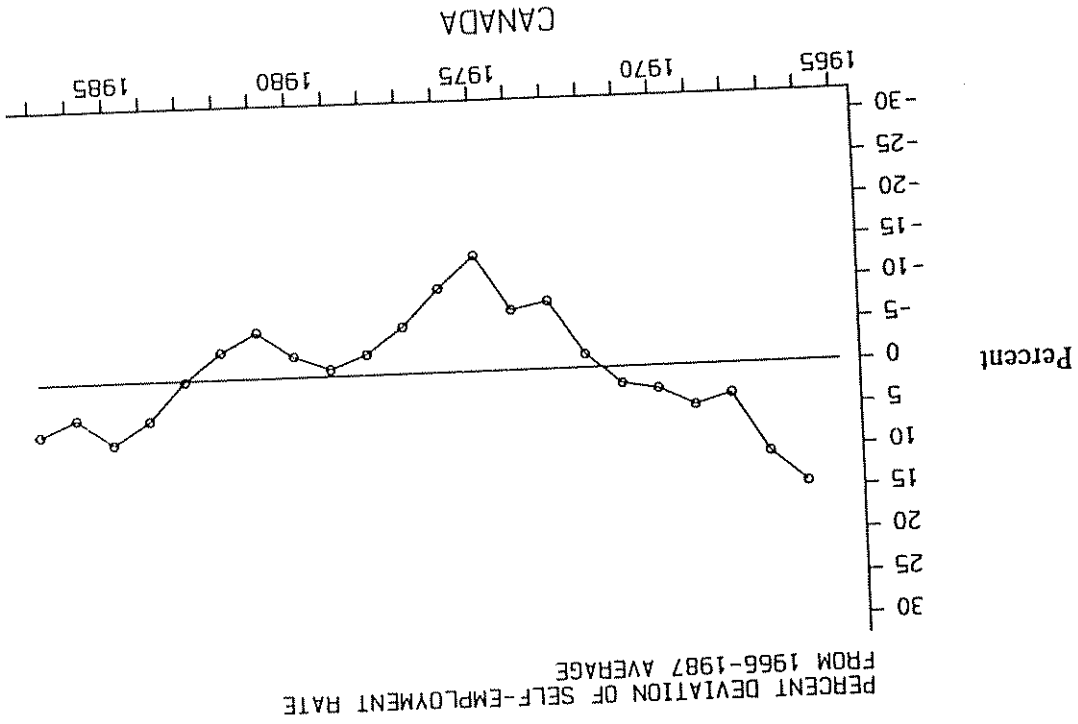
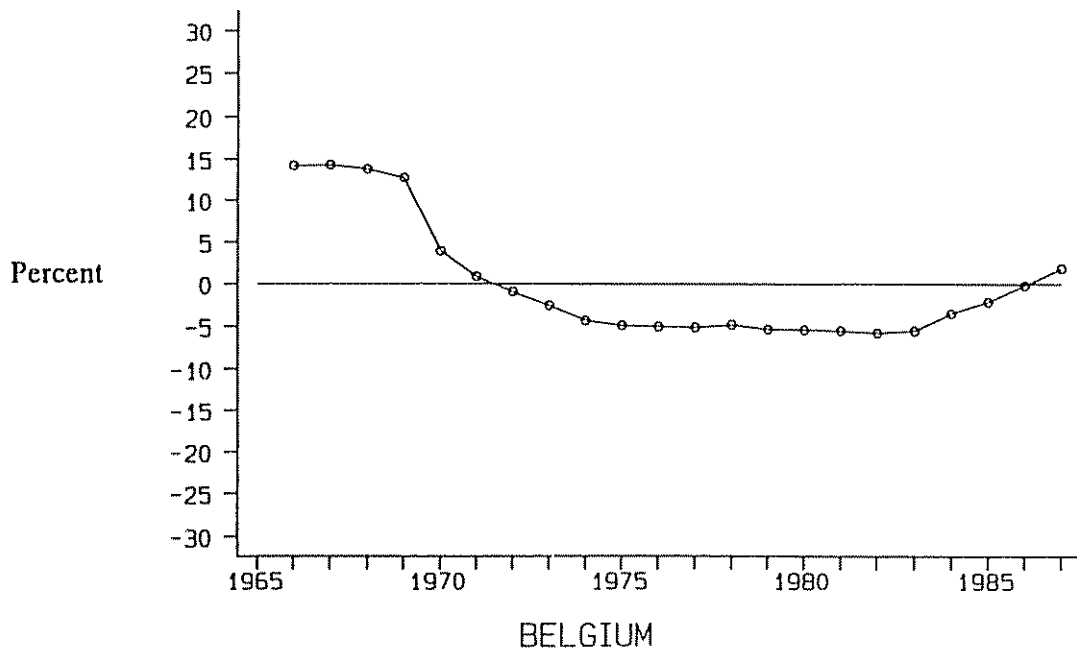




Figure B3

PERCENT DEVIATION OF SELF-EMPLOYMENT RATE  
FROM 1966-1987 AVERAGE



Country	Percent Change in Self-Employment Rate		
	1966-1976	1976-1984	1966-1984
ARGENTINA	-10.61	NA	NA
BOTSWANA	NA	NA	-63.76
CHILE	17.72	-0.51	17.12
COSTA RICA	-17.74	29.16	6.25
CYPRUS	-12.60	NA	NA
ECUADOR	-11.05	-1.43	-12.33
EGYPT	-11.10	1.43	-9.83
GUATEMALA	13.55	7.83	22.44
HAITI	-11.04	51.65	34.90
HONG KONG	-16.14	-8.97	-23.67
INDONESIA	-13.75	27.59	10.04
JORDAN	NA	NA	-26.50
KOREA, RE	-12.41	-6.35	-17.97
KUWAIT	-22.25	-16.28	-34.91
MALAYSIA	NA	NA	-4.67
MEXICO	-9.08	-13.27	-21.14
MOROCCO	NA	NA	-32.90
NEPAL	-8.87	22.81	11.92
PANAMA	5.46	-29.40	-26.55
PARAGUAY	-8.30	-2.73	-10.80
PERU	2.06	NA	NA
PHILIPPINES	-9.72	NA	NA
PUERTO RICO	-1.04	-8.17	-9.13
SRI LANKA	-13.90	2.19	-12.02
THAILAND	51.45	-33.25	1.10
TRINIDAD	-22.84	4.41	-19.44
TUNISIA	-1.50	-10.30	-11.64
UNITED AR	NA	-24.73	NA
VENEZUELA	-23.61	2.31	-21.84
YUGOSLAVIA	-14.95	-24.12	-35.46

Self-Employment Changes for Lesser  
Developed Countries

Self-employment changes in the LDCs follow two major patterns as shown in Table 6. (1) The self-employment rate decreased 1966-1976 and 1976-1984 in 9 countries. (2) The self-employment decreased from 1966-1976 but increased from 1976-1984 in 8 countries. In three countries the self-employment rate first increased and then decreased and in one country the self-employment rate increased during both periods.

### III. EXPLANATIONS FOR TEMPORAL AND CROSS-SECTIONAL DIFFERENCES

These comparisons raise two sets of questions. (1) Why is there such diversity of the self-employment rates across countries? Does this diversity result from cultural, institutional, or economic factors? (2) Why has self-employment declined in some countries and risen in others? What factors are behind the reversal of the trend away from small firms, a trend that is especially pronounced in the Anglo-Saxon countries? Did these factors not occur in other countries where self-employment continued to decline, or were they offset by still other factors?

In this section, we explore a number of possible answers to these questions. We explore six possible sources of intercountry and intracountry variations: (1) stages of economic development; (2) the bias of technological change; (3) changes in industry composition; (4) demographic characteristics, in particular female labor-force participation; (5) unemployment; and (6) cultural factors. We describe our reasons for pointing to these particular sources of variation in more detail below and present anecdotal and statistical evidence on each of these sources.<sup>12</sup> In the next section we report the results of a regression on a panel of 21 OECD countries for which consistent time series data were available on some of the key variables.

<sup>12</sup>The detailed regression results for the estimates presented in this section are reported in an appendix that is available from the authors upon request.

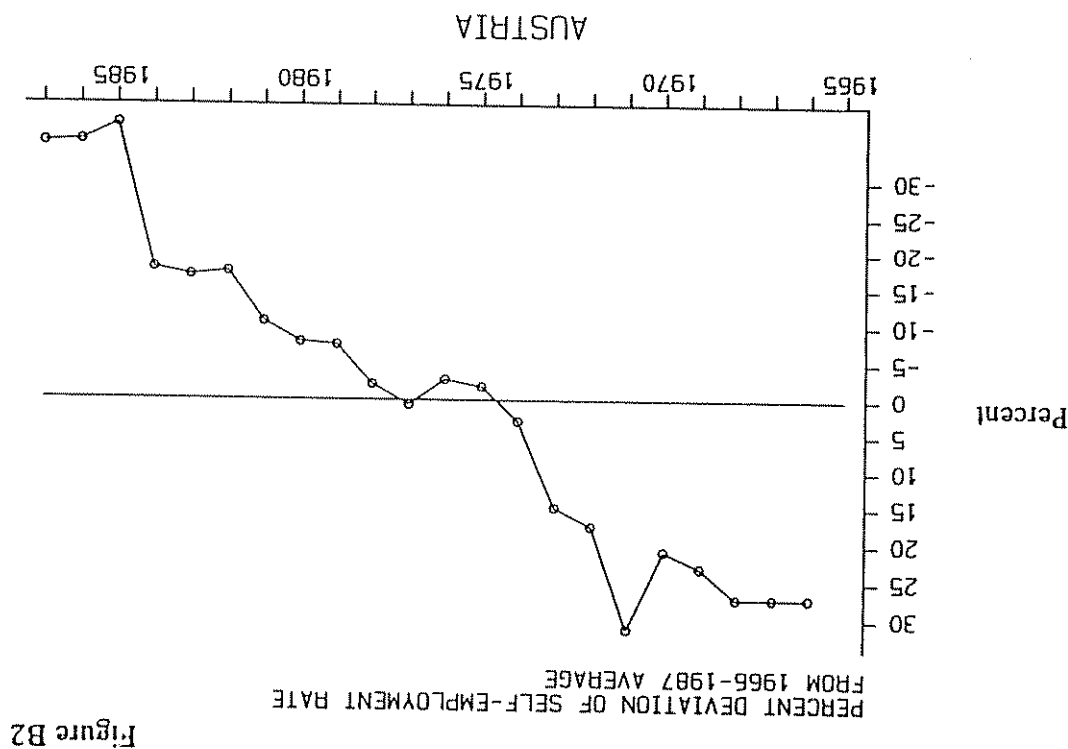


Figure B1



Table 6  
 Pattern of Self-Employment Changes for Lesser Developed Countries  
 1966-1976, 1976-1986

1976-1984	1966-1976	1976-1986
Increase in Self-Employment Rate	Decrease in Self-Employment Rate	Increase in Self-Employment Rate
	PUERTO RICO HONG KONG PARAGUAY ECUADOR YUGOSLAVIA SOUTH KOREA TUNISIA KUWAIT MEXICO	COSTA RICA HAITI EGYPT TRINIDAD NEPAL VENEZUELA SRI LANKA INDONESIA
	CHILE THAILAND PANAMA	GUATEMALA

### A. Economic Development

There are several reasons to expect that the self-employment rate will decrease as economies become more developed.<sup>13</sup> Lucas (1978) develops a model of the size distribution of firms in which individuals have different endowments of what might be called business acumen or managerial ability. He shows that, in this model, average firm size is an increasing function of the wealth of the economy if the elasticity of substitution between capital and labor is less than unity. When the elasticity of substitution is less than unity, an increase in the capital stock increases the returns from working and decreases the returns from managing. Marginal managers find they can earn more money working. Lucas tests this implication by regressing employees per firm (as a proxy for average firm size) against per capita gross national product (as a proxy for the per capita capital stock) using time series data for the United States during the 20th century. He finds a statistically significant positive relationship between average firm size and the capital stock. He estimates that a 1 percent increase in per capita GNP causes an approximately 1 percent increase in employees per firm. In his model, increases in the capital stock will increase the returns to wage work relative to self-employment and thereby decrease the self-employment rate.

There are other, more simplistic, explanations for why the self-employment rate may decline as economies develop. Improvements in the economy's infrastructure such as transportation, telecommunications, and credit markets probably increase the advantages of larger firms over smaller firms. Improvements in transportation and telecommunications make it cheaper to distribute goods and services over larger areas. Assuming there are scale economies up to a point, better distribution systems enable firms to operate larger production units that can serve larger markets. The impact

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<sup>13</sup>Kuznets (1966) observed the tendency for the self-employment rate to decline with economic development. See Schmitz (1988) for a brief summary of some of the literature on self-employment and economic development.

## Appendix A—Data Sources

Civilian labor force, civilian employment, the unemployment rate and self-employment—for the OECD countries—were obtained from the OECD's Labor Force Statistics, Paris, France, various years. The self-employment rate for the Lesser Development Countries come from the International Labour Organization's Yearbook of Labour Statistics, Geneva, Switzerland, various years.

Per-capita gross national product, gross national product per dollar of currency, manufacturing and service value added, and the female labor-force participation rates for all countries come from the World Bank Data Base, Washington, D.C.

High-technology employment as a percent of manufacturing employment for all countries comes from the Industrial Statistics Yearbook, Vol. 1 (General Industrial Statistics), United Nations, 1988. Data were classified for four International Standard Industrial Classification (SIC) industries. These include: 351 Industrial Chemicals, 353 Other Chemical Products, 382 Machinery, nec, 383 Electrical Machinery, 3 Total Manufacturing. In the Netherlands, major group 210, 353, 355, and 356 are included in 351. For the United States, 1986 figures are used for 1987 because figures were not available for 1987.

The uncertainty avoidance index and the individualism index come from the HERMES database and are reported in G. Hofstede, Culture's Consequences (New York: Sage Publications, 1984).

of improvements in credit markets is less clearcut. Liquidity constraints deter entry and expansion by firms of all sizes.<sup>14</sup> However, liquidity constraints are probably a less severe problem for smaller firms and especially the self-employed than for larger firms. Small-scale producers can bypass credit market constraints to some extent by using savings and loans from relatives. These alternatives are not helpful for large-scale producers. Therefore, the development of stock and bond markets and venture capital markets may stimulate firm growth and increase the returns from working for a larger firm.

To test the Lucas hypothesis we have estimated an ordinary-least squares regression between the self-employment rate and per-capita gross national product for 22 OECD countries for 1986. We found that a ten percent increase in per-capita GNP is associated with a 4.2 percent decrease in the self-employment rate (with a standard error of 1.3 percent). Using the panel of OECD countries we estimated that a ten percent increase in per-capita GNP is associated with a 1.5 percent decrease in the self-employment rate (with a standard error of .2 percent).

We obtained a similar result for the LDCs. For 1984, we estimated that a ten percent increase in per-capita GNP is associated with a 3.5 percent decrease in the self-employment rate (with a standard error of .9 percent). Combining the several years of data available to us we found that a ten percent increase in per-capita GNP is associated with a 2.8 percent decrease in the self-employment rate (with a standard error of .2 percent). Thus, as suggested by Lucas's (1978) model, increases in economic development lead to a decrease in the number of business owners.

We also examined the development of capital markets on self-employment. We measure the development of capital markets by dollars of gross national product per dollar of currency used to make payments. Countries which support their gross national product with a smaller amount of

<sup>14</sup>See Evans and Jovanovic (1989).

currency in circulation presumably have more extensive alternative payment systems such as checking and credit cards. The development of non-currency based payment systems probably reflects the development of capital markets. For the OECD panel, we find that a ten percent increase in the GNP-Currency ratio is associated with a .93 percent decrease in the self-employment rate (with a standard error of .05), holding per-capita GNP constant.<sup>15</sup> For the LDC panel, we find that a ten percent increase in the GNP-currency ratio is associated with a .20 percent decrease in the self-employment rate (with a standard error of .06).<sup>16</sup> As expected, then, the development of capital markets is associated with a decrease in the self-employment rate.

#### B. Technological Change

Blau (1987) argues that the near simultaneous reversal in the United States, Japan, France, West Germany, and Italy of the secular trend towards lower self-employment rates suggests a fundamental economic change. Blau (1987, p. 448) suggests that "changes in technology, such as personal computers, have made small firms more competitive in many industries." He shows that the time series of self-employment is correlated with a measure of the extent to which technological changes have been biased towards industries in which self-employment is important, based on time series data for the United States between 1948 and 1982.<sup>17</sup>

<sup>15</sup>The 1987 cross-sectional result is similar—a ten percent increase in the GNP-Currency ratio is associated with a statistically significant .6 percent decrease in the self-employment rate holding per-capita GNP constant.

<sup>16</sup>For the 1984 cross-section the estimated elasticity is .98 with a standard error of .62.

<sup>17</sup>He takes the ratio of the average total factor productivity changes weighted by the self-employment rate to the average total factor productivity changes weighted by the non self-employment rate.

Storey, D. J., "The Birth of New Firms - Does Unemployment Matter?: A review of the Evidence," *Small Business Economics*, 3(3), September, 1991, 167-178.

Syrquin, M., "Patterns of Structural Change," Chapter 7 in Handbook of Development Economics, (New York: North Holland, 1988), 203-273.

Williamson, Oliver E., Markets and Hierarchies, New York, NY: Macmillan Publishing Co., 1975.

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There are, of course, at least two difficulties with this explanation. The first is that there was not a reversal of the trend towards lower self-employment rates in a number of industrialized market economies including France and Japan. The second is that personal computers had barely been introduced and were certainly not widespread at the end of the time period considered by Bian.

There are, nevertheless, some reasons to suspect that technological changes may have increased the relative returns to self-employment, especially during the 1980's. Notwithstanding our earlier argument, improvements in information-exchange technologies such as telecommunications may decrease the costs of and increase the returns from self-employment. As Coase (1937) argued in his classic paper on the firm, transaction costs make it cheaper to organize certain productive relationships within a firm than within a market.<sup>18</sup> Improvements in communication reduce transactions costs and may decrease the optimal amount of horizontal and vertical integration. Express mail services, photocopying services, personal computers, and cheaper and more reliable telephone service make it less expensive and less time consuming for geographically separate individuals to exchange information. In particular, we would expect that firms would subcontract more of their service-related work with improvements in communications and reductions in inter-firm transactions costs. Unfortunately, the data necessary for testing this hypothesis are not readily available.

There is another possible impact of recent technological changes on the size distribution of firms. Recall that Lucas (1978) finds that average firm size increases with increases in per capita wealth under the assumption that capital and labor are substitutes. Diwan and Chakaraborty (1991) find that capital and labor are complements in high technology industries such as semiconductors and telecommunications. The introduction and expansion of high-technology industries over

<sup>18</sup>See Williamson (1975) for a more modern and exhaustive discussion of these issues.

time—beginning in the mid 1970's in the developed countries—may have decreased the elasticity of substitution between capital and labor and thereby stemmed the tendency for average firm size to increase.<sup>19</sup>

To test this hypothesis we calculated the percent of manufacturing employment in the four industries that Diwan and Chakarabory classified as high-technology—industrial chemicals; other chemical products; machinery, not elsewhere classified; and other electrical machinery. The necessary data were available for 1969-1987 for 14 OECD countries. We estimated the following regression using these panel data:

$$\begin{aligned} \text{Log(Self-Employment Rate)} = & -0.7512 \\ & (0.3701) \\ & - 0.1736 \text{ Log(GNP/Population)} \\ & (0.0392) \\ & + 0.2028 \text{ Log(High-Tech Percent)} \\ & (0.0883) \end{aligned}$$

R-Square = 0.0863

F-Statistic = 12.09

Observations = 259

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<sup>19</sup>These results are consistent with Acs and Audretsch (1987) who find that small firms have the innovative advantage in high-technology industries and that large firms have the innovative advantage in mass production industries.

Evans, D. S. and Jovanovic, B., "Estimates of a Model of Entrepreneurial Choice Under Liquidity Constraints," Journal of Political Economy, 1989b, 97, vol. 4, 808-827.

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Highfield R. and Smiley, "New Business Starts and Economic Activity," International Journal of Industrial Organization, 1987, 5: 51-66.

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Thus, after controlling for the stage of economic development, there is a positive correlation between the percent of manufacturing employment in high-technology industries and the self-employment rate.<sup>20</sup> This result is consistent with Lucas's (1978) model together with Diwan and Chakaraborty's (1991) finding on the complementarity of capital and labor in high-technology industries: the expansion of high-technology industries tempers the decline in the self-employment rate that result from increases in per capita wealth. However, for the IDC's we found that there was a negative correlation between the self-employment rate and the development of the high-technology sector, holding per-capita gross national product constant.

### C. Changes in Industry Composition

As economies develop the composition of output changes. Development economists distinguish three major stages of development. In the first stage, the economy specializes in the production of agricultural products and small-scale manufacturing. In the second stage, the economy shifts towards manufacturing. In the third stage, with increasing wealth the economy shifts away from manufacturing towards services.<sup>21</sup>

The first stage is marked with high rates of non-agricultural self-employment. Sole proprietorships—i.e. the self-employed—probably account for most small manufacturing firms and service firms. The second stage is marked by decreasing rates of self-employment. Increases in the

<sup>20</sup>We estimated a similar equation for the cross-section of 14 countries for 1986. The sign-pattern was similar but the individual coefficient of the high-technology variable was not statistically significant.

<sup>21</sup>See Syrquin (1988) for further discussion.

size of the domestic market enable the establishment of firms and industries with scale economies.<sup>22</sup> The creation of larger firms may decrease the returns to self-employment by reducing the profitability of small operations and increasing the returns to wage work. The third stage is marked by decreases in the share of manufacturing in the economy. According to Syrquin (1988), virtually all of the industrialized market economies experienced a decline in manufacturing in the last twenty years. The service sector expanded relative to manufacturing. Since service firms are smaller on average than manufacturing firms, economy-wide average firm size may decline. Moreover, service firms provide more opportunities for self-employment. Therefore, we would expect that manufacturing would be negatively correlated with self-employment for developed economies and positively correlated with self-employment for developing economies.

To test these hypotheses we measured the role of manufacturing in the economy by the ratio of value added created in manufacturing to gross national product; we measured the role of the service sector in the economy in a similar way. For the OECD panel we found a statistically significant negative correlation between the self-employment rate and the manufacturing ratio and a statistically significant positive correlation between the self-employment rate and the service ratio, holding per-capita gross national product constant.<sup>23</sup> As expected, we found the reverse result for

<sup>22</sup>Chenery and Syrquin (1975) found that a greater share of value added is concentrated in capital-intensive industries such as heavy metals, chemicals and paper in larger than in smaller countries.

<sup>23</sup> The regression was  $\text{Log}(\text{Self-Employment Rate}) = -1.3502 (.1910) - .1777 (.0238) \text{Log}(\text{Per Capita GNP}) - .2503 (.0572) \text{Log}(\text{Manufacturing Value Added/GNP}) + .3648 (.0592) \text{Log}(\text{Service Value Added/GNP})$ ; standard errors are in parentheses. The R-Square was .5048 and the F-Statistic 114.18 with 340 observations. The 1987 panel yielded a similar sign pattern but the coefficients were statistically insignificant.

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Following Lucas (1978) we conjectured that as economies become more capital-intensive optimal firm size increases and the returns to entrepreneurship versus wage work decreases. We found robust evidence of this effect from cross-section and panel regressions for OECD countries and cross-section regressions for LDCs.

Economic development is an extremely powerful force behind the secular decline in self-employment rates. But, as we have seen, the convergence of several factors—notably the decline of heavy manufacturing and, possibly, the increase in unemployment—in the 1970's tended to stem the inexorable decline in the self-employment rate for some countries. It is likely, however, that these factors are temporary. Self-employment will, most likely, continue its downward trend as per-capita wealth increases in the developed and lesser-developed countries. Our findings results suggest that the resurgence in many countries of small businesses—at least those operated by the self-employed—may be less the result of an entrepreneurial revolution and more the consequence of mundane structural shifts in these countries' economies.

the LDC panel: manufacturing was positive and statistically significant while service was negative and statistically significant.<sup>24</sup>

#### D. Demographic Changes

A number of studies have found the likelihood that an individual is self-employed at a point in time depends on the individual's demographic characteristics. The likelihood of self-employment increases at a diminishing rate with age according to studies by Borjas (1986), Brock and Evans (1986), Rees and Shah (1987), Evans and Leighton (1989a), and Gerri de Wit (1991).<sup>25</sup> Members of certain immigrant groups are also more likely to be self-employed according to several studies by Borjas (1987). Women are less likely to be self-employed according to Evans and Leighton (1989b).<sup>26</sup> Evidence on education, however, is mixed depending upon the particular samples considered. (See Elyans and Leighton (1989a) who find that the probability of being self-employed increases with education for young white men.)

The fact that the likelihood of self-employment depends strongly on demographic characteristics suggests that variations in demographic characteristics over time and across countries may explain variations in the self-employment rate over time and across countries. Over the time

<sup>24</sup>The regression was  $\text{Log}(\text{Self-Employment Rate}) = -0.6415 (.1412) - .2661 (.0193) \text{Log}(\text{Per Capita GNP}) + .1781 (.0530) \text{Log}(\text{Manufacturing Value Added/GNP}) - .1549 (.0539) \text{Log}(\text{Service Value Added/GNP})$ ; standard errors are in parentheses. The R-Square was .4345 and the F-Statistic 84.13 with 331 observations. The 1987 panel yielded a similar sign pattern but the coefficients were statistically insignificant.

<sup>25</sup>The likelihood of self-employment also increases as men reach retirement age as shown by Fuchs (1980).

<sup>26</sup>For countries for which we have been able to obtain data on self-employment for men and women, the self-employment rate for women is always lower than the self-employment rate for men.

period studied here, there has been an especially large change in the labor-force participation rates of women. For the OECD countries, women as a percent of the labor force increased from 34.8 in 1966 to 38.1 in 1987.<sup>27</sup> In 1987, women as a percent of the labor force varied from a low of 24.2 percent in Spain to a high of 46.8 percent in Finland for the OECD countries. There is also a fair amount of variation in the percent of the labor force accounted for by women across the LDC countries for which we were able to obtain data. In 1987, women as a percent of the labor force ranged from a low of 5.6 percent in the United Arab Emirates to a high of 48.8 percent in Rwanda.

If the propensity of working women to be self-employed were constant over time, increases in the labor force participation rate of women would tend to decrease the self-employment rate. The reason for this is that women have a substantially lower self-employment rate than men. For the OECD countries the average ratio of the female self-employment rate to the male self-employment rate was 64 percent.<sup>28</sup> The increasing participation of a group with a relatively low propensity for self-employment would tend to lower the overall self-employment rate. Moreover, the negative effect of the increasing female labor-force participation rate on the self-employment rate is magnified by the fact that the propensity of women to work for themselves has decreased in most of the countries for which we have data. We compared the ratio of the female-to-male self-employment rate for 1987 and 1966 for 10 OECD countries. The female-to-male ratio decreased in Australia, Belgium, Canada, Finland, Germany, Italy, Japan, and the United Kingdom. It increased only in Norway and the U.S.

The increase in the female labor-force participation rate has been associated with a decline in the self-employment rate for the OECD countries. Controlling for per-capita GNP, we estimated

<sup>27</sup>Figures are based on a labor-force weighted average across 22 OECD countries.

<sup>28</sup>The figure is based on a labor-force weighted average for 13 OECD countries for which data were available.

increased importance of services in the industrialized economies has brought with it an increased number of self-employed.

We have used the estimates from the fixed-effects regression in Table 7 to determine what pattern the equation predicts. We regressed predicted log self-employment on time and time square for each country along the lines described in Section 2 above. Finally, we examined whether the predicted time series of self-employment for each country—the estimated coefficients on time and time-squared—is similar to the actual time series. We found that the equation generally predicts a U-shaped pattern for 19 of the 21 countries in our panel; that was a correct prediction in 12 cases.

This finding indicates that the “normal” experience in the last quarter century should have been U-shaped self-employment.<sup>26</sup> That then raises and, unfortunately leaves, the question of why some countries such as Japan had  $\cap$ -shaped self-employment and others such as the Australia had rising self-employment. We suspect the explanations are idiosyncratic. But further research is required here.

## VI. SUMMARY

This paper has documented that there is a tremendous diversity in the self-employment rate across countries and in the time-series of the self-employment rate across countries. A major explanation for this diversity is the stage of economic development. While the tendency for the self-employment rate to decline with economic development was recognized as earlier as Kuznets (1966), this paper is the first attempt we are aware of to estimate the statistical relationship between self-employment and economic development and to test a theoretical explanation for this relationship.

<sup>26</sup>This finding is consistent with Evans and Leighton (1989a) who find that structural and demographic shifts accounted for the time-series of male and female self-employment in the United States.

Table 8  
Estimated Fixed Effects for OECD Countries Relative to the United States<sup>1</sup>

Country	Time Period	Fixed Effect	Standard Error
AUSTRALIA	1968-1987	.3692	.0332
AUSTRIA	1968-1987	.1629	.0546
BELGIUM	1968-1987	.1500	.0688
CANADA	1968-1985	-.1354	.0316
DENMARK	1969-1987	.1033	.0399
FINLAND	1968-1987	-.1823	.0458
FRANCE	1977-1987	.2885	.0435
GERMANY	1968-1987	.1105	.0472
GREECE	1977-1987	.7952	.0906
ICELAND	1973-1986	.0446	.0413
IRELAND	1970-1979	.0119	.0535
ITALY	1970-1987	.6853	.1105
JAPAN	1968-1987	.4734	.0885
LUXEMBOURG	1970-1986	.2308	.0780
NETHERLANDS	1975-1987	.0462	.0552
NORWAY	1968-1987	-.1190	.0444
SPAIN	1980-1986	.3051	.1084
SWEDEN	1970-1987	-.3942	.0394
TURKEY	1970-1980	.0828	.0782
UNITED KINGDOM	1968-1986	.0860	.0351
UNITED STATES	1968-1987	.0000	n/a

<sup>1</sup>Based on a regression of self-employment against per-capita gross national product, manufacturing value added as a percent of gross national product, service value added as a percent of gross national product, and women as a percent of the labor force, all measured in logs. The regression is reported in the "Within Country" column of Table 8.

that a 1 percent increase in the labor force participation rate has been associated with a statistically significant 1.1 percent decrease in the self-employment rate in the OECD panel (standard error of .09 percent). As a further test we estimated a regression of the log change in the self-employment rate against the log change in per-capita GNP and the log change in the female labor-force participation rate, where the changes were taken over ten-year time intervals. We found that, controlling for changes in GNP, a ten percent increase in the female labor-force participation rate is associated with a 3.3 percent decrease in the self-employment rate (with a standard error of 1.8 percent which makes the coefficient marginally significant). For the LDC's, however, the correlation between the female labor-force participation rate and the self-employment rate was small and statistically insignificant.

#### E. Unemployment

Unemployment affects self-employment in two different but related ways. First, unemployment reduces the average alternative opportunity cost of entering self-employment. We would therefore expect to see a positive correlation between entry into self-employment and whether a particular individual is unemployed. Evans and Leighton (1989a, 1990) have shown that individuals who have experienced a spell of unemployment are roughly twice as likely as individuals who are working to become self-employed.<sup>29</sup> While individuals who enter self-employment from unemployment are more likely to return to wage work than individuals who enter self-employment from wage work, the higher entry rate offsets the higher exit rate for the self-employed. As a result,

<sup>29</sup>This result is consistent with Highfield and Smiley (1987) who found that increases in the rate of new business incorporations were positively correlated with increases in the unemployment rate. It is also consistent with Audretsch and Acs (1991) who found that new-firm startups respond positively to high unemployment rates.

at a point in time the self-employed are more likely to have experienced one or more spells of unemployment during their careers than are wage workers.<sup>30</sup>

Second, unemployment may be associated with a depressed economy in which the revenues that entrants into self-employment might expect are depressed. We would therefore expect to see a negative correlation between business formation rates and economy-wide or region-wide unemployment rates. Several studies for the United Kingdom, summarized by Storey (1991), find that the rate of new business formation is lowest in regions with the highest unemployment rate.

Empirically, the first effect dominates the second effect for the sample considered here. Holding per-capita GNP constant, we find that a 10 percent increase in the unemployment rate is associated with a 1.5 percent increase in the self-employment rate (with an estimated standard error of .3 percent) using data for the OECD panel. It is likely, however, that this correlation reflects the long-lived effects of high unemployment rates on self-employment rates as found by Evans and Leighton (1989a). To test this, we examined the correlation between the unemployment rate lagged five years and the self-employment rate holding per-capita GNP constant. We found that a 10 percent increase in the lagged unemployed rate was associated with a 1.3 percent increase in the current self-employment (with a standard error of .3 percent).

#### F. Sociological Factors

The final set of factors we consider might be described as cultural or sociological. Uncertainty about the future is a basic fact of human life. The desire to avoid uncertainty varies

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<sup>30</sup>Bogenhold and Staber (1990) find a positive correlation with unemployment and self-employment for seven OECD countries. However, as pointed out earlier, their measure of self-employment leads to this result as a matter of definition.

there is a random effect for each country. The sign and magnitude of the random-effects results are very similar to the fixed-effect results although it is possible to reject equality at the 3 percent level.<sup>34</sup>

The consistency of the results in Table 7 across different estimation methods and with and without controls for country-specific effects suggests strongly that self-employment varies systematically with economic development (measured by per-capita GNP), the relative importance of manufacturing and services, and female labor-force participation. The results in Table 7 are also robust to dropping one or more of the other variables.<sup>35</sup>

The regressions in Table 7 provide a clue as to why self-employment has followed a U-shaped pattern over time for most of the OECD countries. Self-employment generally declines with secular economic growth. In most of the countries this trend was accentuated by the increasing role of women, who as a group are less likely to own businesses, in the labor force. However, the

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<sup>34</sup>The fact that we cannot reject the null hypothesis that the random and fixed-effect coefficients are equal indicates that the random effects are not orthogonal to the dependent variable. See Greene (1990).

<sup>35</sup>We have also estimated a model containing all of the variables discussed in the previous section. Consistent data were available on 13 countries. The results are less robust for this smaller panel. In an ordinary least squares regression, the variables discussed in the previous section all of the signs reported in the simple regressions reported in the last section and are generally significant at the 5 percent level or better. In the within-country, across-country, and random-effects regressions the high-technology is negative and statistically significant and the GNP/Currency variable is positive and statistically significant. Also, while the per-capita GNP variables remains consistently negative it becomes statistically insignificant. There is, however, less variation in the variables in this smaller panel. Together with the high correlation between the fixed effects and the independent variables, it is difficult to distinguish between the effects of the economic variables and idiosyncratic country effects in this smaller panel.

Table 7  
Estimated OLS, Fixed-Effects and Random-Effects Regressions  
for the OECD Panel<sup>1</sup>

Estimated coefficients  
Standard errors

Variables in logs	Ordinary Least Squares Estimates	Within-Country Estimates <sup>1</sup>	Between-Country Estimates <sup>1</sup>	Random Effects Estimates <sup>2</sup>
GNP/Population	-.0685 .0230	-.0545 .0184	-.0702 .0872	-.0458 .0184
Manufacturing Value Added/GNP	-.1449 .0505	-.1200 .0613	-.1559 .2190	-.1234 .0608
Services Value Added/GNP	.2409 .0526	.1484 .0620	.2544 .2272	.1749 .0615
Female Workforce/Total Workforce	-.9010 .0876	-.3187 .1387	-.8835 .3202	-.4810 .1300
Adjusted R-Square	0.6267	.9308	0.6946	0.8932
F-Statistic	141.58	10.56	9.10	553.37
Observations	336	336	21	336

<sup>1</sup>Table 8 lists the countries and time periods included in the regression.

<sup>2</sup>The R-Square excluding the fixed effects is .1129.

<sup>3</sup>The variance of the general error disturbance is .0085 while the variance of random effects is .0475.

<sup>4</sup>The F-Statistic for the hypothesis that the random effects are orthogonal is F-Statistic: 11.3316  
P-Value: .0300

among people. Hofstede (1984) has calculated an uncertainty avoidance index for a number of countries. The index is based on three indicators: rules orientation, employment stability, and stress. If a country has a high level of uncertainty avoidance, we would expect to find that advancement to management positions, working for small organizations, and competition among employees tend to be risky situations which fewer people are willing to face. Hofstede also reports an individualism index. This index measures the relationship between the individual and the collectivity which prevails in a given society.<sup>31</sup> These measures correspond to our cultural stereotypes. Germany and Japan rank very high on uncertainty avoidance and very low on individualism. Australia ranks very low on uncertainty avoidance and very high on individualism. The effect of these sociological variables on self-employment is not clear a priori. On the one hand, a high self-employment rate reflects a high interest in entrepreneurship and the risk taking and individualism that accompanies entrepreneurship. On the other hand, a high self-employment rate reflects a low stage of economic development and society's lack of success in creating successful, larger enterprises. The second effect dominates even after holding per-capita GNP constant. We find that self-employment is positively correlated with the uncertainty avoidance and negatively correlated with individualism for both the OECD and LDC panels and cross-sections.<sup>32</sup>

<sup>31</sup>These indices are based on surveys of employees of large multinational corporations. The indices are based on a total of 60,000 respondents for 53 countries. See Hofstede (1984) for further details.

<sup>32</sup>The correlations are statistically significant for the OECD panel, marginally significant for the OECD cross-section and LDC panel, and insignificant for the LDC cross-section.

#### IV. ANALYSIS OF THE OECD PANEL

The hypotheses explored in the preceding section are not, of course, mutually exclusive. Some combination of them might explain time series and cross-sectional variations in the self-employment rate. Moreover, the analysis presented in the previous section did not attempt to control for country-specific factors that were not captured in the variables under consideration. Unfortunately, data limitations prevented us from conducting a comprehensive analysis of all of the variables discussed in the previous section for the OECD and LDC countries controlling for country-specific effects. Only a few years of data were available for the LDCs. Many of the variables were not available for a number of years for the OECD countries.

We were able, however, to develop a more or less consistent panel data on 21 OECD countries which are the subject of this section. Data were available for most of the countries and most of the years on self-employment, per-capita gross national product, manufacturing value added, service value added, and the female labor-force participation rate. Since these were found to be important explanatory variables in the preceding section we have focused on them. The inclusion of other variables reduces the sample size considerably.

To assess the robustness of the conclusions reached in the earlier section, we have estimated four alternative multiples with the OECD panel: (1) an ordinary least squares regression; (2) a fixed-effects regression based on deviations from the within-country means over time; (3) a regression across countries based on the weighted average values of the variables over time; and (4) a random effects which assumes that each country has a time-constant random disturbance attached to it.<sup>33</sup> consideration.

<sup>33</sup>For discussion of these models, see Greene (1990).

Table 7 reports the results of regression based on 336 observations on 21 countries each of which was observed for up to 22 years. The list of countries and associated time periods are presented in Table 8. Column (2) of Table 7 reports a simple ordinary least squares regression without any controls for country-specific effects. As we would expect from the results of the earlier section, self-employment decreases with increases in per-capita gross national product, female labor-force participation, and the relative importance of manufacturing and increases with increases in the relative importance of services. These qualitative relationships remain after controlling for country-specific fixed effects. In column (3) we report estimates that are based on a regression that includes dummy variables for each country to control for time invariant country-specific effects that are not captured by the other regressions. (This is arithmetically equivalent to estimates of a regression of the deviation of self-employment from its country-specific mean on the independent variables also expressed as deviations from their country-specific means.) The coefficients on the dummy variables—i.e. the fixed effects—show the amount of each country's self-employment that is not accounted for by the four explanatory variables. Table 8 reports the estimated fixed effects relative to the United States. The results show that Japan has unusually high self-employment while Sweden has unusually low self-employment relative to the United States, after controlling for the key determinants of self-employment. In column (4) we report estimates that are based on the average of the dependent and independent variables over time for each country. With only 21 observations, the coefficients are not estimated very precisely. But the sign pattern of the coefficients are similar to those in the other regressions. Finally, column (5) reports estimates under the assumption that