Cyclical Variations in Participation and Employment in Urban Labor Markets: the Case of Colombia and Mexico

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Abstract

This paper examines two related questions about the behavior of urban labor markets in Mexico and Colombia. The first question involves the response (in terms of direction and sensitivity) of labor participation and employment to changes in aggregate demand, while the second relates to differences in this cyclical sensitivity across age, skill and gender groups. Its main findings are that in both countries, when aggregate demand falls (and thus aggregate unemployment increases), adult females, teenagers of both genders and older individuals enter the labor force. The net effect of this inflow of "new" workers in the economy is to increase the overall proportion of the population that is employed in spite of the decline in aggregate economic activity (although they may increase the overall unemployment rate). These findings generate important policy implications for Mexico and Colombia.

Resumen

Este artículo examina dos preguntas (relacionadas) acerca del comportamiento del mercado laboral en México y Colombia. La primera tiene que ver con la respuesta, en términos de dirección y magnitud, de la participación laboral y el empleo ante cambios en la demanda agregada. La segunda es sobre las diferencias de esta sensibilidad al ciclo para diferentes grupos de edad, habilidades y género. Los hallazgos principales permiten concluir que, en ambos países, cuando la demanda agregada cae (y por ende el desempleo agregado aumenta), las mujeres adultas, los adolescentes de ambos géneros y los individuos mayores de 65 años entran a participar en el mercado laboral. El efecto neto de la entrada de estos nuevos trabajadores es un incremento en la proporción de la población total que se encuentra empleada (aunque la tasa de desempleo agregada puede aumentar), a pesar de un descenso en la actividad económica agregada. Estos hallazgos generan implicaciones de política importantes para México y Colombia.

Keywords: Labor market, Labor force participation, Unemployment, Employment, Labor policies, Business cycle.
Palabras clave: Mercado laboral, Participación laboral, Desempleo, Empleo, Políticas laborales, Ciclo económico.
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I. Introduction

This paper tries to analyze some aspects related to the behavior of urban labor markets in Colombia and Mexico, two of the largest countries in Latin America and the Caribbean (LAC) in terms of population, comprising almost 25 percent of the total population living in that region.[4] The main purpose is to examine in some detail two related questions about the behavior of the urban labor market in those countries. The first question asks for the response (in terms of direction and sensitivity) of labor participation and employment to changes in aggregate demand. The second question relates to differences in this cyclical sensitivity across age, skill and gender groups. That is, it inquires how different population groups, defined in terms of age, gender and skills, change their participation in the labor market in reaction to movements in output (GDP), and how this change is translated into different variations of employment rates across groups.

There is very little empirical evidence available on either of these two issues. In most cases, analyses and policies are based on casual inferences derived from the evidence available for the US labor market or from simple movements in average participation and employment rates across time. Clark and Summers (1981), for example, demonstrate that in the US, teenagers and young women are particularly sensitive to short-run movements in aggregate economic activity. In effect, teenagers and young women between 20 to 34 years of age comprise only 25 percent of the adult population, but they account for more than 50 percent of the cyclical variation in total employment. In contrast, adult men between 26 and 64 years of age, who comprise 33 percent of the population, account for only 24 percent of the change in employment.[5]

A pre-requisite for the design of an appropriate and effective labor market policy (be it oriented to social protection or to increase the pace of employment creation) is having considerable knowledge about the sensitivity of employment and labor market participation to changes in the level of aggregate demand. Also, it is instrumental to learn how different groups of the population change their labor participation when aggregate demand changes, because, in the end, this behavioral aspect will determine employment levels for both the individual groups, and for the entire population. Efforts to increase aggregate employment (or within any specific demographic group) must take into consideration how the unemployment rate and the labor force participation rate of groups vary with changes in the level of economic activity. In the same way, any policy to provide social protection (e.g., unemployment insurance) to the most vulnerable must analyze this sensitivity in order to identify what groups are more prone to becoming unemployed when, for example, economic activity is reduced.

II. Data and Empirical Analysis

The questions posed above will be investigated using a rigorous methodology, based on simple

[4] Over 140 million people live in the two countries: 44 million in Colombia and 98 million in Mexico.

[5] A recent paper by Gomme *et al.* (2004) builds on the heterogeneity of cyclical employment across demographic groups documented by Clark and Summers (1981) to extend the predictive power of the standard business cycle model.

decompositions of labor market relationships (definitions) that allow the assessment of how each demographic group responds in terms of employment and participation to movements of the business cycle. It was first proposed by Clark and Summers (1981) and it is explained in some detail below.

The employment to population ratio *(E/N)* which will be used to approximate employment for age and gender group g, can be decomposed as the product of the employment rate *(E/L)* of group g and the labor force participation rate *(L/N)* of the same group g.[6] Specifically,

$$\left[\frac{E}{N}\right]^g \equiv \left[\frac{E}{L}\right]^g \left[\frac{L}{N}\right]^g \qquad (1)$$

After transforming logarithmically and taking the total differential of both sides of identity *(1)*, one obtains

$$dln\left[\frac{E}{N}\right]^g = dln\left[\frac{E}{L}\right]^g + dln\left[\frac{L}{N}\right]^g \qquad (2)$$

or,

$$dln\left[\frac{E}{N}\right]^g = dln(1 - UR)^g + dln\left[\frac{L}{N}\right]^g \qquad (3)$$

where *UR* denotes the unemployment rate.[7]

The main focus of this study is to examine the sensitivity of each one of the two terms on the right hand side of equation *(3)* to the level of aggregate economic activity for every age and gender group separately. The sensitivity of the employment to population ratio to changes in aggregate demand is likely to differ significantly across demographic groups. Identity *(3)* reveals that the net effect of cyclical fluctuations in aggregate demand on the employment to population ratio is determined by how the cyclical sensitivity of the employment rate and labor force participation rate varies across different groups. As long as certain age and gender groups of workers are more likely to enter the labor force or to be laid-off due to employers' laying-off regulations or characteristics of labor demand, or have a higher tendency to leave the labor force over the business cycle, then there are likely to be differences in the extent to which the employment to population ratio varies with the business cycle for each group.

In order to examine the cyclical sensitivity of employment and labor force participation, the analysis estimates separate regressions, which use, as explanatory variables, the current and various lags of the aggregate unemployment rate (AUR) as a proxy for aggregate demand, a trend (T)

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6 *E* stands for the number of people employed, *N* for the total population and *L* for those who participate in the labor market (the employed plus the unemployed).

7 Note that by definition the labor force is the sum of those employed and unemployed (i.e., $L = E + U$). This implies that $\left[\frac{E}{N}\right] = \left[1 - \frac{U}{L}\right] = (1 - UR)$.

Also that as long as *UR* is not too high, which it is for the case of Mexico in the period studied and Colombia except 1998-2002, then $ln(1-UR) \cong -UR$ so equation *(3)* may also be expressed as

$dln\left[\frac{E}{N}\right]^g = -dUR^g + dln\left[\frac{E}{N}\right]^g$, where *dUR* is the change in the unemployment rate (not logged).

and trend squared, and three indicator variables for the quarters in calendar year (Q_i). Note that these variables seek to approximate the business cycle and control for its seasonality. Thus, the equations estimated for each age and gender group, indexed by the superscript g, are

$$ln\left[\frac{L}{N}\right]_t^g = \alpha_0^g + \alpha_1^g T + \alpha_2^g T^2 + \sum_{j=0}^{L}\beta_j^g AUR_{t-j} + \sum_{i=2}^{M}\gamma_i^g Q_i + \varepsilon_t^g \qquad (4)$$

and

$$ln(1 - UR)_t^g = \delta_0^g + \delta_1^g T + \delta_2^g T^2 + \sum_{j=0}^{L}\theta_j^g AUR_{t-j} + \sum_{i=2}^{M}\phi_i^g Q_i + \eta_t^g \qquad (5)$$

Equations (4) and (5) are intended as a reduced from approximation for the cyclical determinants of labor force participation and employment rates. A more structural approach would include additional explanatory variables, such as the inflation rate and the wage rate corresponding to the demographic group g. However, such variables may also be co-determined cyclically with labor force participation and employment, raising problems about endogeneity and identification. The inclusion of the trend and trend-squared allows for the long-run (secular) trend in growth of the economy to be controlled for, whereas the three indicator variables for the quarters are included in order to control for seasonality.

Controlling for the long-run trend, the AUR variable serves as a measure of the cyclical conditions of the economy. The unemployment rate is widely considered to be an appropriate indicator of cyclical aggregate demand relative to real GDP (Clark and Summers, 1981; Bils, 1985; Keane, Moffitt and Runkle, 1988; Abraham and Haltiwanger, 1995; Dellas and Sakellaris, 2003).

A. Data Sets

For Colombia, the data used come from the National Household Survey (*Encuesta Nacional de Hogares* - ENH until 2000 and *Encuesta Continua de Hogares* - ECH since 2001). This survey has been undertaken quarterly since 1984 by the Administrative Department of Statistics (*Departamento Administrativo Nacional de Estadística* - DANE). The sample and areas covered have changed over the years, but they have remained fairly uniform since 1984. The seven cities covered in this analysis are Bogotá, Cali, Medellín, Barranquilla, Bucaramanga, Manizales and Pasto.[8] The survey includes information on socio-economic characteristics

Table 1

TIME SPANS COVERED BY THE DATA

Country	Period of coverage	Frequency of survey	Lag Length (L)	Indicator variables for seasonality (Q)
Colombia	1984: I -2004: I	Every quarter	7	3 indicator variables for each quarter
Mexico	1987: I-2001: III	Every quarter	7	3 indicator variables for each quarter

[8] Even though other cities have also been analyzed in some years with different periodicity, this analysis includes only the seven main cities always included throughout the years in order to maintain comparability.

for every individual in the household such as education, family structure, and dwelling characteristics. It also contains detailed information about employment, unemployment and labor market withdrawal. The analysis in this paper covers from the first quarter of 1984 to the first quarter of 2004 (for a total of 81 quarterly observations). It is important to note that beginning in 2001, the survey became continuous (information is gathered everyday of the year rather than the last week of the quarter, as was done prior to 2001). However, by accumulating samples, it is still possible to construct quarterly databases with comparable samples after 2001.

For Mexico, the data are extracted from the National Urban Employment Survey (*Encuesta Nacional de Empleo Urbano or* ENEU). The ENEU has been undertaken quarterly since 1986 by National Institute of Statistics and Geography (known by its Spanish acronym as ENEGI) and the sample and areas covered have been expanded over the years. As of 1999, the survey has included 44 metropolitan centers and over 100,000 households. The ENEU contains information on time use for individuals aged 12 and over, education, family structure, and dwelling characteristics, as well as a standard set of detailed questions on employment, unemployment and labor market withdrawal. This analysis relies on the surveys from 1987 (first quarter) to 2001 (third quarter), for a total of 59 quarterly observations. Although the survey is designed as a rotating panel, all survey rounds are treated as repeated cross-sectional surveys[9]. Individual labor force status (employment, unemployment and being out of the labor force) is defined according to the standard definitions.

The specification of equations *(4)* and *(5)* allows the AUR to affect the current period labor force participation and employment rate with a lag. Reasonable explanations as to why the AUR of previous quarters may affect current participation and employment rates include delays in the realization that aggregate economic activity has changed, as well as further delays in responding to these changes due to frictions and other types of transactions costs, may be. The lag length is specified to be up to eight quarters long. Additional exercises were carried with shorter lag -lengths (four quarters).

The total effect of the AUR on labor force participation of group g is given by the sum of the coefficients of the current period unemployment and all its lags, i.e.

$$\beta_{LF}^{g} = \sum_{j=0}^{7} \beta_j$$

whereas the total effect of the cycle (proxied by AUR) on the employment rate *(1-UR)* of group g is given by

$$\theta_{1-UR}^{g} = \sum_{j=0}^{7} \theta_j$$

The estimates of these total effects, along with their *p-values*, are presented in Table 2 for the case of Mexico. The coefficients reported for the employment to population ratio are obtained by estimating a version of equation *(4)* with *(E/N)* on the left-hand side. In principle, since equation *(3)* is an identity, the total effect of AUR on the employment to population ratio could also be derived from the sum of the effect of AUR on participation and employment, i.e., $(\beta_{LF}^{g} + \theta_{1-UR}^{g})$.

[9] Specifically, in the ENEU survey, a household is followed for five consecutive quarters.

Table 2

CYCLICAL RESPONSE OF PARTICIPATION, UNEMPLOYMENT AND EMPLOYMENT BY AGE AND GENDER GROUPS

Part A: Mexico

Demographic group	Employment to population ratio	Participation rate	Employment rate
Women			
12-15	3.4261	4.0558	-0.6297
	(0.004)	(0.001)	(0.001)
16-19	-1.4526	-0.2628	-1.1898
	(0.035)	(0.557)	(0.00)
20-24	-0.9071	-0.0491	-0.8580
	(0.003)	(0.994)	(0.00)
25-34	0.9535	1.4573	-0.5037
	(0.00)	(0.00)	(0.00)
35-44	1.1489	1.4341	-0.2851
	(0.001)	(0.00)	(0.00)
45-54	2.3737	2.5567	-0.1829
	(0.00)	(0.00)	(0.00)
55-64	3.5990	3.7201	-0.1210
	(0.00)	(0.00)	(0.00)
65+	2.7154	2.7997	-0.0844
	(0.007)	(0.006)	(0.029)
Men			
12-15	1.4651	2.0821	-0.6169
	(0.161)	(0.045)	(0.00)
16-19	-2.2299	-1.0307	-1.1992
	(0.00)	(0.04)	(0.00)
20-24	-0.7741	-0.0724	-0.7017
	(0.013)	(0.695)	(0.00)
25-34	-0.4039	0.0151	-0.4190
	(0.005)	(0.912)	(0.00)
35-44	-0.3661	-0.0629	-0.3032
	(0.00)	(0.437)	(0.00)
45-54	-0.3455	-0.0009	-0.3446
	(0.008)	(0.994)	(0.00)
55-64	-0.2134	0.1032	-0.3166
	(0.347)	(0.632)	(0.00)
65+	0.3140	0.5804	-0.2664
	(0.43)	(0.153)	(0.00)

Note: *p-values* in parentheses.
Source: Authors' calculations.

Part B: Colombia

Demographic group	Employment to population ratio	Participation rate	Employment rate
Women			
12-15	6.2186	6.9171	-0.6985
	(0.0000)	(0.0000)	(0.1090)
16-19	2.6275	3.1089	-0.4814
	(0.0000)	(0.0000)	(0.1700)
20-24	0.1480	0.9138	-0.7659
	(0.5630)	(0.0000)	0.0010)
25-34	0.6284	1.1181	-0.4897
	(0.0010)	(0.0000)	(0.0000)
35-44	0.8466	1.0105	-0.2582
	(0.0000)	(0.0000)	(0.0030)
45-54	1.2950	1.5776	-0.2826
	(0.0000)	(0.0000)	(0.0010)
55-64	2.0213	2.4035	-0.3822
	(0.0000)	(0.0000)	(0.0000)
65+	2.6790	2.9663	-0.2873
	(0.0010)	(0.0000)	(0.0090)
Men			
12-15	3.8858	4.2707	-0.3840
	(0.0020)	(0.0000)	(0.3220)
16-19	0.2519	1.5335	-1.2817
	(0.5370)	(0.0000)	(0.0000)
20-24	-1.0112	0.1448	-1.1560
	(0.0000)	(0.2850)	(0.0000)
25-34	-0.5692	0.0700	-0.6392
	(0.0000)	(0.0880)	(-8.4000)
35-44	-0.3561	0.0969	-0.4530
	(0.0000)	(0.0010)	(0.0000)
45-54	-0.3398	0.1232	0.4630
	(0.0000)	(0.0280)	(0.0000)
55-64	0.0093	0.5461	-0.5368
	(0.9580)	(0.0010)	(0.0000)
65+	0.4357	0.8547	-0.4190
	(0.2970)	(0.0320)	(0.0010)

Note: *p-values* in parentheses.
Source: Authors' calculations.

The estimates reveal substantial heterogeneity across age groups within genders, as well as across gender within any given age group. Cyclical falls in aggregate economic activity (proxied by increases in the AUR) appear to be associated with dramatic changes in the gender composition of employment and labor force participation in Mexico. Lower aggregate demand is associated with a decline in the proportion of males employed in most age categories and an increase in the proportion of women employed, except those between 16 and 24 years of age. For

example, an increase in the national unemployment rate of one percentage point leads to a 1.15-point increase in the proportion of employed 35-to-44-year-old women. The most important source of this change is the increased participation of women. The sensitivity of the labor force participation rate of women between 35 and 44 years of age is 1.43 points, which is greater than the estimated change in employment, suggesting that the entry of women into the labor force also contributes to the increase in the overall unemployment rate. This is confirmed by the estimated negative elasticity of the employment rate of 35-to-44-year-old women (-0.28).

An examination of the elasticity estimates for males reveals a different picture. The labor force participation of adult males does not appear to be at all sensitive to cyclical fluctuations, except for that of the youngest groups. For example, for 35-to-44-year-old males (as for most adult male age groups), the estimated labor force participation elasticity is not statistically different from zero. This implies that changes in the employment rate of most males translate almost directly into changes in the proportion of the male population employed (compare the estimated elasticity of the employment to population ratio and the elasticity of the employment rate).

Labor force participation of young teenagers (12 to 15 years old) appears to be highly sensitive to cyclical changes in aggregate demand. An increase in the national unemployment rate of one percentage point leads to a 2.1 percent increase in the labor force participation of teenage males and 4.1 percent in the female rate. Also, the proportion of employed individuals among those groups of boys and girls increases drastically (3.4 percent for girls and 1.5 percent for boys) but the increase is smaller than the increase in the labor force participation rate. Comparably large changes are observed in the proportion employed among older women (55 and older).

In order to investigate further into the heterogeneity of response, equations *(4)* and *(5)* are also estimated separately for age and gender groups 12 to 24 years old, separately for those attending school and those who do not and for age and gender groups 24 and older, differentiating by skill level (skilled and unskilled workers.) An individual is defined as attending school if he/she is reported to have devoted more than 10 hours studying during the last week. Also, an individual is classified as skilled if he/she has more than 9 years of education, and as unskilled otherwise. These new estimates are presented in Tables 3 and 4.

The estimates in Table 3 reveal that teenage men and women who are already out of school do not exhibit any significant change in their participation rate. For this group of individuals, an increase in the unemployment rate by one percentage point tends to be associated with an almost equal drop in their respective employment rate. Given that there is no significant change in the labor force participation rate, the fall in the employment rate tends to translate into a drop in the employment to population rate (although this fall is not statistically significant).

Strikingly different estimates are obtained for those attending school. The labor force participation rate of teenage males (12 to 19 years old) seems to exhibit a high sensitivity to increases in the national unemployment rate (i.e., a downfall of the cycle) of one percentage

Table 3

CYCLICAL RESPONSE OF PARTICIPATION, UNEMPLOYMENT AND EMPLOYMENT BY SCHOOL ENROLLMENT STATUS OF 12-TO-24YEARS-OLDS

Part A: Mexico

Demographic group	Employment to population ratio	Participation rate	Employment rate
a. Not-Enrolled in/Not attending in school			
Women			
12-15	0.8526	1.8619	-1.0093
	(0.71)	(0.41)	(0.00)
16-19	-1.0828	0.1756	-1.2583
	(0.26)	(0.85)	(0.00)
20-24	-0.6566	0.2510	-0.9076
	(0.05)	(0.43)	(0.00)
Men			
12-15	-1.5937	-0.6141	-0.9795
	(0.47)	(0.78)	(0.00)
16-19	-1.5888	-0.3088	-1.2800
	(0.03)	(0.67)	(0.00)
20-24	-0.4289	0.2975	-0.7264
	(0.24)	(0.40)	(0.00)
b. Enrolled in/Attending in school			
Women			
12-15	14.8201	14.6688	0.1513
	(0.00)	(0.00)	(0.72)
16-19	1.1475	1.5716	-0.4241
	(0.32)	(0.21)	(0.23)
20-24	-0.5371	0.0923	-0.6293
	(0.47)	(0.89)	(0.00)
Men			
12-15	11.5737	11.6686	-0.0949
	(0.00)	(0.00)	(0.70)
16-19	2.8975	3.8365	-0.9390
	(0.03)	(0.00)	(0.00)
20-24	-0.0384	0.9128	-0.9511
	(0.96)	(0.23)	(0.00)

Note: *p-values* in parentheses
Source: Authors' calculations.

Part B: Colombia

Demographic group	Employment to population ratio	Participation rate	Employment rate
a. Not-Enrolled in/Not attending in school			
Women			
12-15	1.9171	3.2406	-1.3236
	(0.0910)	(0.0000)	(0.0230)
16-19	0.5710	1.5800	-1.0090
	(0.2970)	(0.0000)	(0.0100)
20-24	0.3696	1.1327	-0.7631
	(0.1090)	(0.0000)	(0.0020)
Men			
12-15	0.0700	1.2545	-1.1845
	(0.9320)	(0.0360)	(0.0100)
16-19	-1.7190	-0.2141	-1.5049
	(0.0000)	(0.3660)	(0.0000)
20-24	-1.1717	0.0307	-1.2024
	(0.0000)	(0.6890)	(0.0000)
b. Enrolled in/Attending in school			
Women			
12-15	8.7464	8.7475	-0.0011
	(0.0020)	(0.0010)	(0.9990)
16-19	2.9831	2.4979	0.4852
	(0.0440)	(0.0380)	(0.5400)
20-24	-0.6035	-0.1061	-0.4974
	(0.3310)	(0.8580)	(0.2020)
Men			
12-15	6.9169	6.3953	0.5215
	(0.0010)	(0.0010)	(0.3150)
16-19	2.3192	3.1524	-0.8332
	(0.0520)	(0.0210)	(0.1390)
20-24	-1.0724	0.0672	-1.1396
	(0.0990)	(0.9090)	(0.0000)

Note: *p-values* in parentheses
Source: Authors' calculations.

point in unemployment leads to an 11.7 percent increase in the labor force participation rate of 12-to-15 -year-olds and to a 3.8 percent increase in that of 16-to-19-year-old males. Even though the employment rate of 16 to 19 year olds falls (independently of whether they attend school or not), teenage males enter the labor force either searching for a job or directly into some sort of employment. The large change in the participation rate tends to overtake the decrease in the employment rate resulting in an overall increase in the employment to population ratio of 16 to 19

Table 4

CYCLICAL RESPONSE OF PARTICIPATION, UNEMPLOYMENT AND EMPLOYMENT BY SKILL LEVEL

Part A: Mexico

a. Unskilled

Demographic group	Employment to population ratio	Participation rate	Employment rate
Women			
25-34	1.7636	2.3305	-0.5668
	(0.00)	(0.00)	(0.00)
35-44	2.1192	2.4064	-0.2872
	(0.00)	(0.00)	(0.00)
45-54	2.8215	3.0388	-0.2173
	(0.00)	(0.00)	(0.00)
55-64	3.9436	4.1032	-0.1597
	(0.00)	(0.00)	(0.00)
65+	2.9726	3.0222	-0.0496
	(0.005)	(0.004)	(0.068)
Men			
25-34	-0.3772	0.0907	-0.4679
	(0.019)	(0.558)	(0.00)
35-44	-0.4020	-0.0636	-0.3384
	(0.001)	(0.538)	(0.00)
45-54	-0.4336	-0.0577	-0.3759
	(0.016)	(0.723)	(0.00)
55-64	-0.3995	-0.0533	-0.3462
	(0.15)	(0.835)	(0.00)
65+	0.0470	0.3393	-0.2923
	(0.901)	(0.376)	(0.00)

b. Skilled

Women			
25-34	0.2182	0.6863	-0.4681
	(0.251)	(0.00)	(0.00)
35-44	-0.0103	0.2853	-0.2956
	(0.971)	(0.326)	(0.00)
45-54	0.8843	1.0019	-0.1175
	(0.033)	(0.018)	(0.006)
55-64	1.8244	1.7827	0.0417
	(0.011)	(0.013)	(0.499)
65+	0.5611	1.1670	-0.6058
	(0.81)	(0.632)	(0.042)
Men			
25-34	-0.4723	-0.0960	-0.3763
	(0.001)	(0.454)	(0.00)
35-44	-0.3980	-0.1279	-0.2701
	(0.00)	(0.09)	(0.00)
45-54	-0.5378	-0.2266	-0.3112
	(0.00)	(0.011)	(0.00)
55-64	0.0229	0.2239	-0.2010
	(0.943)	(0.465)	(0.00)
65+	1.4098	1.5444	-0.1346
	(0.2)	(0.16)	(0.079)

Note: *p-values* in parentheses.
Source: Authors' calculations.

Part B: Colombia

a. Unskilled

Demographic group	Employment to population ratio	Participation rate	Employment rate
Women			
25-34	-0.3593	0.3496	-0.7089
	(0.0640)	(0.0150)	(0.0000)
35-44	-0.2583	0.2386	-0.4969
	(0.1840)	(0.1490)	(0.0000)
45-54	0.5108	0.6657	-0.1549
	(0.2310)	(0.0900)	(0.2940)
55-64	-1.5463	-0.9665	-0.5799
	(0.1800)	(0.3890)	(0.0410)
65+	10.3022	11.0746	-0.7724
	(0.0180)	(0.0080)	(0.4210)
Men			
25-34	-0.3903	0.2304	-0.6207
	(0.0070)	(0.0270)	(0.0000)
35-44	-0.3257	0.0941	-0.4198
	(0.0000)	(0.0230)	(0.0000)
45-54	-0.4713	0.0357	-0.5069
	(0.0010)	(0.6550)	(0.0000)
55-64	-0.0331	0.5504	-0.5835
	(0.9270)	(0.1150)	(0.0000)
65+	0.3746	0.5316	-0.1571
	(0.7220)	(0.5900)	(0.5330)

b. Skilled

Women			
25-34	-0.0279	0.5991	-0.6270
	(0.8690)	(0.0000)	(0.0000)
35-44	0.1695	0.6745	-0.5050
	(0.3470)	(0.0000)	(0.0000)
45-54	0.5102	0.9040	-0.3938
	(0.1520)	(0.0100)	(0.0010)
55-64	-0.0464	0.7019	-0.7483
	(0.9560)	(0.3970)	(0.0000)
65+	3.4989	3.7788	-0.2799
	(0.1070)	(0.0660)	(0.4580)
Men			
25-34	-0.4730	0.1372	-0.6102
	(0.0000)	(0.0180)	(0.0000)
35-44	-0.3998	0.0569	0.4567
	(0.0000)	(0.0750)	(0.0000)
45-54	-0.3819	0.1377	-0.5951
	(0.0030)	(0.0820)	(0.0000)
55-64	0.4173	0.9127	-0.4954
(	0.1700)	(0.0010)	(0.0000)
65+	0.2949	0.3079	-0.0130
	(0.6980)	(0.6660)	(0.9430)

Note: *p-values* in parentheses.
Source: Authors' calculations.

year olds (as well as 12 to 15 year olds). Clearly, the aggregate estimates of Table 3 tend to hide a significant heterogeneity in sensitivity of employment and labor force participation of teenagers depending on their school attendance status.

Table 4 reveals a substantial heterogeneity among skilled and unskilled workers. Increases in the national unemployment rate appear to be associated with a large increase in the labor force participation rate (and the overall employment to population rate) of unskilled women. In contrast, the cyclical sensitivity in the labor force participation rate of skilled women is considerably lower. Also, the overall employment to population rate of skilled women does not appear to be affected. This clearly reflects two important facts. First, unskilled women tend to participate much less in the labor market than their skilled counterparts and, second, when the economy worsens its performance -usually increasing the unemployment rate among unskilled men- unskilled women tend to increase their participation rates dramatically to compensate for foregone household incomes. The same is true for young boys and girls among households headed by unskilled parents (see, for example, Santa María and Rojas, 2002 for a thorough documentation of this fact in Colombia). The corresponding estimates for adult males are similar to those discussed in Table 3. Irrespective of the skill level, labor force participation of adult males does not appear to be affected, as expected.

B. Demographic Contribution to Cyclical Variation of Employment, Participation, and Unemployment

Having provided evidence on the extent to which the cyclical sensitivity of employment and unemployment varies across age and gender groups in the population, it is also useful to generate estimates of the relative importance of the various age groups in accounting for cyclical movements in aggregate employment, participation and unemployment. The detailed background information needed for such an exercise is provided in Appendix tables A.1, A.2 and A. 3. Instead of going through the full set of estimates, we present and discuss Table 5, which contains a set of aggregated measures.

Overall, the results suggest a substantial change in the gender composition of employment during the business cycle. The population-weighted-elasticity estimates of the employment-to-population ratio for different groups, presented in column (3) of Table 5 reveal that, in the general population, fewer adult men and 16 to 24 year olds enter employment, while more adult females, older persons and younger teenagers enter employment. The total elasticity of the employment to population ratio implies that a one-percent increase in the national unemployment rate leads to a 0.4 percent increase in employment (the employment to population rate). Thus, an increase in the national unemployment rate is associated with an increase of overall employment in the population due to increased participation of certain groups, such as the ones mentioned above. As shown below, much of this increased employment is actually "self-employment" or informal employment. The opposite pattern is observed in the US labor market, where for the economy as an aggregate, a one-percent increase in the prime-age-male unemployment rate (used as a measure of changes in aggregate economy activity) leads to a 1.5-percent decline in the employment to population ratio (Clark and Summers, 1981). Thus, in the US, "discouraged

Table 5
DEMOGRAPHIC CONTRIBUTION TO CYCLICAL VARIATION

		Population-weighted elasticity		
	Population share (1)	(E/N) (2)	(L/N) (3)	(E/L) = (1-UR) (4)
Panel A: Mexico				
Teenagers 12-15	0.119	0.290	0.364	-0.074
Teenagers 16-19	0.121	-0.223	-0.078	-0.145
Young workers 20-24	0.138	-0.116	-0.008	-0.108
Adult women 25-64	0.298	0.479	0.577	-0.098
Adult men 25-64	0.261	-0.094	0.000	-0.093
Older men & women	0.062	0.104	0.114	-0.010
Total	**1.000**	**0.440**	**0.969**	**-0.529**
Panel B: Colombia				
Teenagers 12-15	0.1028	0.521	0.577	-0.055
Teenagers 16-19	0.1108	0.170	0.264	-0.094
Young workers 20-24	0.1423	-0.053	0.080	-0.134
Adult women 25-64	0.3158	0.314	0.422	-0.117
Adult men 25-64	0.2643	-0.103	0.038	-0.095
Older men & women	0.064	0.110	0.132	-0.022
Total	**1.000**	**0.958**	**1.515**	**-0.518**

Source: Authors' calculations.

worker" effects appear to be dominant during cyclical fluctuations. The higher unemployment rate tends to discourage potential workers about their prospects of employment, preventing them from entering the labor market and searching for a job. In contrast, in Mexico, the increased employment to population ratio suggests that significant "added worker" effects are in operation. The added worker effect states that secondary workers such as women and teenagers who are not strongly attached to the labor force join the labor market when economic conditions deteriorate, and pull out of the labor market when conditions improve (e.g., Skoufias and Parker, 2004; Cunningham, 2001; World Bank, 2001).

Table 5 is also helpful at getting a better understanding of the sources of the employment changes and the observed added worker effect. The total population weighted-elasticity estimate of the employment-to-population ratio is, by definition, equal to the sum of the total population-weighted-elasticity of the labor force participation (i.e., 0.97) and the employment rate (or one minus the unemployment rate) (i.e., -0.53). These elasticity estimates imply that a one-percent increase in the unemployment rate is accompanied by a 0.97 percent increase in the labor force participation rate and a 0.53 decrease in the employment rate. Thus, the observed growth in the employment to population ratio during the business cycle is driven by the entry of new adult female workers into the labor force. Table 5 also reveals that adult females (25 to 64 year olds) account for almost 60 percent (=0.577/0.969) of the increase in labor force participation, followed by young teenagers

between 12 and 15 years of age, who account for 38 percent (= 0.364/0.969) of the increase, and older adults (65-year-olds or older) who account for 11.8 percent of the increase.

Teenagers (15 to 19 year olds) and young adults (20 to 24 year olds) account for 41 percent of the drop in the employment rate (or the increase in unemployment). Adult women are responsible for only 18.6 percent of the increased unemployment rate, even though they account for 60 percent of the increase in labor force participation. A similar pattern is observed for young teenagers (12 to 15 year olds). Even though their participation is very sensitive to the business cycle, they contribute only 14 percent (=0.074/0.529) to the drop in the employment rate (or the increase in unemployment). As is the case for adult women entering the labor force, young teenagers appear to enter into informal employment, probably under the supervision of the adult females and males, rather than contributing much to the unemployment pool.

Now, turning to the Colombian case, the estimates of the responses of the different demographic groups to the economic cycle are presented in the second part of Table 3 (part B). They also reveal substantial heterogeneity across age groups within gender, as well as across gender within any given age group. Cyclical decreases/increases in aggregate economic activity (proxied by the unemployment rate of prime aged men) appear to be associated with dramatic changes in the gender composition of employment. Lower aggregate demand is associated with a decline in the proportion of males employed in most age categories and an increase in the proportion of women employed. For example, an increase in the UAR of one percentage point leads to a 1.3 percentage points increase in the proportion of employed 45-to-54-year-old women. The most important source of this change is the increased participation of women as a consequence of the decline in aggregate demand. The sensitivity of labor participation for women between 35 and 44 years of age is 1.6 points, which is greater than the estimated change in employment, suggesting that the entry of women into the labor force also contributes to the increase in the overall rate of unemployment. Note also that this is true for most of the age groups within women, which reveals a key message: all groups of women substantially increase their participation rate when economic activity slows down (this rise being especially large among younger and older women), but in every case their unemployment rate increases (i.e., many of them enter unemployment). This last fact is shown by the negative sign of the employment rate.

An examination of the elasticity estimates for males reveals a different picture. Labor participation of adult males displays a very small sensitivity to cyclical fluctuations. For example, for 20-to-34-year-old males, the estimated labor participation elasticities are not statistically different from zero at any of the traditional confidence levels. Those 35 to 44 years of age show a statistically significant elasticity, but it is very small. This implies that changes in the employment rate of most males translate almost directly to changes in the proportion of the male population employed. The labor force participation of teenagers (12 to 19 years old), on the other hand, appears to be highly sensitive to cyclical changes in aggregate demand. An increase in the UAR of one percentage point leads to a 4.3-point increase in the labor force participation of 12-to-15-year-old males and of 1.5 for those 16 to 19

years old. Also, the proportion of the teenage boy population employed appears to increase only for the 12 to 15 age group (3.9 points) but the increase is smaller than the increase in the labor force participation rate, meaning that many of them go to increase the overall unemployment rate. It is important to note that for the 16-to-19 age group, almost all the increase in participation goes to unemployment.

As mentioned above, in order to dig deeper into the heterogeneity of response, the model is also estimated for the 12-to-24 age group, separating those attending school and those that do not, and for age and gender groups 24 and older divided into skilled and unskilled workers, using the same definitions described for the Mexican case. The estimates are presented in Tables 3 and 4, parts B in both. They reveal that teenage men who are already out of school do not exhibit any significant change in their participation rate, except for the youngest group (12 to 15 years old). For the latter, an increase in the UAR of one percentage point is associated with an almost equal drop in their respective employment rate and a similar increase in the participation rate. That is, the employment to population ratio practically does not change, meaning that higher participation usually translates into higher unemployment (many enter unemployment). The situation for enrolled girls, on the other hand, is different. All the groups respond to declines in economic activity. However, only among the youngest (12 to 15) does there seem to be any reaction of employment. For the other two groups, most of the girls/women go to unemployment (especially those in the 16-to-19 age group), and even the estimated elasticities for the employment to population ratio turn out to be non-significant.

Different estimates are obtained for teenage males and females who are enrolled in school. The participation rate of teenage males (12 to 19 years old) attending school seems to exhibit a high sensitivity to the cycle. In fact, an increase of one percentage point leads to a 6.4 points increase in the participation rate of 12-to-15 -year-olds and a 3.2 increase in that of 16-to-19-year-old males. Even though the employment rate of 16-to-19 -year-olds falls, this change is non-significant, whereas the one observed in the employment to population ratio is. That is, the large change in the participation rate tends to overtake the decrease in the employment rate resulting in an overall increase in the employment to population ratio of 16 to 19 year olds (as well as 12 to 15 year olds).

Table 4 also reveals substantial heterogeneity in the cyclical sensitivity of skilled and unskilled workers. Increases in the UAR appear to be associated with increases in the labor force participation rate of unskilled women, which end up in unemployment in the majority of the cases, and even with reductions of the employment to population ratio. The exception from this "general rule" seems to be the 45-to-54-year-old group. The cyclical sensitivity of labor force participation rates of skilled women is similar, but the resulting effects on unemployment do not seem to be as strong (usually lower than the increase in participation rates). As a result, the overall employment to population rate of skilled women does not appear to be affected (none of the coefficients are statistically significant). The corresponding estimates for adult males show a different pattern: participation does not seem to be affected by cyclical variations among the unskilled, and are somewhat affected among skilled men. However, the changes in unem-

ployment are negative and sizeable among the unskilled (in general, larger in magnitude than the participation elasticities, and statistically significant), while among the skilled they are usually smaller than the changes in participation and some groups even increase their employment rate (experience a decrease in unemployment). Indeed, 35-to-44-year-old skilled men increase their participation rates slightly, but their employment rate increases by 0.5 points. However, it is important to note that for the 45-to-54 age group, women perform significantly better than men, for both the unskilled and skilled categories.

Once again, it is also useful to generate estimates of the relative importance of the various age groups in accounting for cyclical movements in aggregate employment, labor participation and unemployment, and Table 5 (panels A and B) contain a set of aggregated measures.

First of all, note that when aggregate demand decreases by one percentage point, overall participation grows by 1.5 and unemployment by 0.52 percentage points. Employment (to population) grows almost by one percentage point. The results suggest, importantly, a substantial change in the gender composition of employment during the business cycle and indicate that teenagers (12 to 19 years of age), young workers (20 to 24) and adult women (25 to 64 years of age) are the groups that move the most the aggregate unemployment rate in response to cyclical variations. Indeed, the total change in the unemployment rate is explained in 29 percent by teenagers, in 26 percent by young adults and in 23 percent by adult women. Adult men have an important effect as well, of around 16 percent. However, when the population shares are considered (for example 11 vs. 26.5 percent for the 16-to-19-year-olds and adult men, respectively) and it is found that their effect on the unemployment rate is almost identical, it is evident that the magnitude of the response of the teenagers is striking. The population weighted elasticity estimates of the participation rate for different groups, presented in the third column, reveal that, in the general population, fewer adult men and 20-to-24-year-olds enter employment, while more adult females, older persons and younger teenagers enter employment. In fact, the figures are impressive. Teenagers (12 to 19 years of age) account for 56 percent of the change in participation, while adult women account for 28 percent. That is, between teenagers and adult women, almost 85 percent of the change in participation due to cyclical variations is explained. The opposite pattern is observed in the US labor market where, for the economy as an aggregate, a one-percent increase in the prime-age-male unemployment rate leads to a 1.5-percent decline in the employment to population ratio. Thus, in Colombia, as in Mexico, the increased employment to population ratio suggests that significant "added worker" effects are in operation.

On the other hand, these results indicate that the labor markets in the urban areas of Mexico and Colombia are very similar to the US in some respects. In each of the three countries, the largest share of the short-term variation in employment is accounted for by young workers and teenagers. As in the United States, teenagers and youth up to 24 years of age are only less than 25 percent of the population and yet they comprise close to 40 percent of the cyclical variation in employment. In contrast, adult men and women account for a smaller share of the cyclical variation in employment than their respective share in the population. In Mexico, a one-percent decrease

in the national unemployment rate leads to a 0.4 percent decline in the employment to population ratio. The negative short-run effect of the increased aggregate demand on employment suggests that economic expansion in the short-run is associated with an overall decrease in employment. This rather unusual case can be attributed to the massive exodus of women from the labor force during periods of economic recovery. As mentioned earlier, during periods of economic decline, women enter the labor force in order to protect household welfare from falling[10]. Moreover, most of the jobs taken by these women are in the informal sector (i.e. self-employment activities). During periods of economic growth these women exit the labor force, leading to a decline in the overall employment.

C. Discussion and Interpretation of the Findings

What may provide a possible explanation for the significant added worker effects observed during the business cycle? In the simple static model of family labor supply, the transitory reduction in family income caused by the loss of employment of the head of household is sufficient to lead to an increase in the likelihood of participation in the labor market of other family members (Ashenfelter, 1980). This added worker effect is enhanced if the increased non-market time of the husband lowers the opportunity cost of market work for the wife, and possibly for children, through substitution in home production. In principle, however, this effect may depend on the extent to which a wife's or child's time in home production is substitutable by the father's time.

According to the dynamic model of family labor supply with perfect credit markets, an unanticipated unemployment spell by the husband is not likely to result in significant added worker effects on other family members (Heckman and McCurdy, 1980; Blundell and McCurdy, 1999), particularly if the husband's unemployment is short lived or his income loss is small relative to his lifetime earnings. In these circumstances, affected families could rely on borrowing from credit markets as a means of smoothing consumption. Added worker effects are more likely to be significant in at least two other cases. First, when families are unable to borrow against their future income and have difficulties in meeting their regular consumption needs during the period of the unemployment spell (Lundberg, 1985). Second, if the current unemployment spell of the husband contains information about his future unemployment prospects and alters the marginal utility of wealth of the household. Then, the life-cycle profile of the wife's current and future labor (and maybe that of children), may be altered (McCurdy, 1985). This latter case, in particular, does not require that credit markets be imperfect.

These considerations are perfectly aligned with the results obtained in this analysis. In particular, it is clear that financial markets are less developed in Mexico or in Colombia than in the US and, thus, the added worker effect tends to dominate in the former countries. Additionally,

[10] In fact, in the urban labor markets of Mexico, women of all ages account for more than 92 percent of the change in labor force participation over the business cycle.

within these countries, access to formal credit is very restricted for unskilled workers or, in general, to workers (or temporarily inactive individuals) belonging to poor households. So, the sensitivity of labor force participation of the unskilled or women and teenagers tends to be higher than that of other groups of workers.

Additionally, in general, the cyclical sensitivity of labor force participation of females and teenagers depends on the extent to which these groups of workers are firmly attached to the labor force. In the US, for example, there is some evidence that the cyclical sensitivity of female labor force participation has declined since the 1970's, as women in the US have become more firmly attached to the labor market (Lloyd and Niemi, 1978). The high sensitivity of labor force participation rates of women in the two countries analyzed, especially in Mexico, is consistent with the interpretation that women in Mexico are not yet strongly attached to the labor force[11].

The increased labor force participation of females tends to be a critical means by which households manage to insure their welfare level in the absence of a formal safety net in Mexico[12] and, perhaps to a lesser extent, Colombia. In addition, this type of behavior suggests that the adoption of a formal unemployment insurance scheme in Mexico may be accompanied with a substantial decline in the cyclical sensitivity of female labor force participation. Cullen and Gruber (2002), for example, argue that one plausible explanation for the rather mixed evidence in the US about the incidence and size of the added worker effect may be found in the "crowding out" effects triggered by the influence of unemployment insurance schemes on spousal labor market behavior. They estimate that women's work hours would be roughly 30 percent higher during their husbands' unemployment spell if there were no unemployment insurance benefits and that the "non-employment" rate of wives with unemployed husbands would drop by almost 45 percent.

IV. Concluding Remarks

The analyses carried out in this paper imply that cyclical fluctuations in aggregate economic activity in Mexico and Colombia, as in the US, are accompanied by dramatic changes in the composition of the labor force. When aggregate demand falls (and thus aggregate unemployment increases) adult females, teenagers of both genders and older individuals enter the labor force, mainly under self employment. The net effect of this inflow of "new" workers in the economy is to increase the overall proportion of the population that is employed in spite of the decline in aggregate economic activity.

These characteristics of labor market behavior have at least two important implications for policy. First, efforts to decrease unemployment and/or increase employment among specific demographic groups need to take into consideration

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11 For more evidence on the long-run relationship between female work and economic development, see, for example, Mammen and Paxson (2000).

12 The reader is referred to Skoufias and Parker (2005) and Parker and Skoufias (2004) for a more detailed investigation of the incidence and size of added worker effects in Mexico.

the way in which their labor force participation responds to cyclical variations. For example, improvement in economic conditions or increases in aggregate demand are likely to decrease the labor force participation of younger teenagers (12 to 15 year olds) and be accompanied by increases in their school attendance. On the other hand, increases in aggregate demand are likely to increase the labor force participation of older teenagers (16 to 24 year olds) and be accompanied by a negative effect on their school attendance (at least among males). In this sense, for the case of Colombia, for example, questions about the convenience of establishing less stringent labor regulations for the young (and possibly women), take renewed importance. Thus, schemes such as lower minimum wages for the young should be revisited and analyzed with less ideology and more technical arguments and data. They can have important positive effects on household income (especially on its variance) and, thus, on household welfare.

Second, the prevalence of added worker effects in periods of weak economic activity, combined with the absence of formal insurance schemes, suggest that the establishment of a national unemployment insurance scheme covering the wage as well as self-employment sector, is likely to replace (or crowd-out) the current private means of insurance with public insurance. This possibility raises some serious concerns about the extent to which the provision of a national unemployment insurance scheme is likely to have any significant positive effects on household welfare.

References

Abraham, Katharine G. and John Haltiwanger (1995), "Real Wages and the Business Cycle", *Journal of Economic Literature*, Vol. 33 (September) pp. 1215-64.

Ashenfelter, Orley, (1980), "Unemployment as Disequilibrium in a Model of Aggregate Labor Supply", *Econometrica*, Vol. 48 (April), pp. 313-36.

Behrman, Jere R., Suzanne Duryea, and Miguel Szekely (1999), "Schooling Investments and Aggregate Conditions: A Household Survey-Based Approach for Latin America and the Caribbean", Inter-American Development Bank, Research Department, Working Paper # 407 (November).

Bills, Mark J. (1985), "Real Wages over the Business Cycle: Evidence from Panel Data", *Journal of Political Economy*, Vol. 93, number 4, (August), pp. 666-89.

Blundell, Richard and Thomas McCurdy (1999), "Labor Supply: A Review of Alternative Approaches", Chapter 27 in 0. Ashenfelter and D. Card, eds., *Handbook of Labor Economics* , Vol. 3A (Elsevier Science Publishers, Amsterdam).

Clark, Kim and Lawrence Summers (1981), "Demographic Differences in Cyclical Employment Fluctuations" *Journal of Human Resources*, Vol. 16, no. 1 (Winter), pp. 61-79.

Cullen, Julie Berry and Jonathan Gruber (2002), "Does Unemployment Insurance Crowd out Spousal Labor Supply?" *Journal of Labor Economics*, Vol. 18, no. 3, pp. 546-572.

Cunningham, Wendy (2001), "Breadwinner or Caregiver? How Household Role Affects Labor Choices in Mexico", Policy Research Working Paper No. 2743, The World Bank. Washington DC.

Deaton, Angus (1997), *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy*, The Johns Hopkins University Press, Baltimore, MD.

Dellas, Harris and Plutarchos Sakellaris (2003), "On the Cyclicality of Schooling: Theory and Evidence" *Oxford Economic Papers*, Vol. 55, pp. 148-172.

Flug, Karnit, Spilimbergo, Antonio, and Erik Wachtenheim (1998), "Investment in Education: Do Economic Volatility and Credit Constraints Matter?" *Journal of Development Economics*, 55, 465-81.

Gomme, Paul, Rogerson, Richard, Rupert, Peter and Randall Wright (2004), "The Business Cycle and the Life Cycle", Unpublished paper.

Heckman, James J. and Thomas E. MaCurdy, (1980), "A Life-Cycle Model of Female Labor Supply", *Review of Economic Studies* 47, 47-74.

Jacoby, H. and E. Skoufias (1997), "Risk, Financial Markets, and Human Capital in a Developing Country", *Review of Economic Studies*, Vol. 64, No. 3, (July), pp. 311-335.

Keane, Michael, Moffitt, Robert and David Runkle (1988), "Real Wages over the Business Cycle: Estimating the Impact of Heterogeneity with Micro Data", *Journal of Political Economy*, Vol. 96, number 6, (December), pp. 1232-66.

Killingsworth, Mark R. and James J. Heckman, (1986), "Female Labor Supply: A Survey", in: 0. Ashenfelter and R. Layard, eds., *Handbook of Labor Economics* (Elsevier Science Publishers, Amsterdam).

Lloyd, Cynthia and Beth Niemi (1978), "Sex Differences in Labor Supply Elasticity: The Implications of Sectoral Shifts in Demand", *American Economic Review*, Vol. 68, no. 2 (May), pp. 78-83.

Lundberg, Shelly (1985), "The Added Worker Effect", *Journal of Labor Economics*, Vol. 3 (January), pp. 11-37.

Lustig, Nora (2000), "Crises and the Poor: Socially Responsible Macroeconomics" *Economia* Vol.1, No. 1, Fall 2000, pp. 1-19.

MaCurdy, Thomas E., (1981), "An empirical model of labor supply in a life-cycle setting", *Journal of Political Economy*, 89, 1059-1085.

Maloney, Tim (1987), "Employment Constrains and the Labor Supply of Married Women: A Reexamination of the Added Worker Effect", *Journal of Human Resources*, vol. 22, no 1, pp. 51-61.

Mammen, Kristin and Christina Paxson (2000), "Women's Work and Economic Development", *Journal of Economic Perspectives*, Vol. 14. Fall.

McKenzie, David (2003), "How do Households Cope with Aggregate Shocks? Evidence from the Mexican Peso Crisis", *World Development*, vol. 31, no. 7 (July), pp. 1179-99.

Montes, Gabriel and Mauricio Santamaria (2004), "Poverty and Labor Market in Urban Mexico", The World Bank.

Parker, Susan, and Emmanuel Skoufias (2004), "The Added Worker Effect over the Business Cycle: Evidence from Urban Mexico", *Applied Economic Letters*, Vol. 11, pp. 625-630.

Pindyck Robert, and Daniel Rubinfeld (1991), *Econometric Models and Economic Forecasts*, 3rd edition, McGraw-Hill Book Company.

Santa María, Mauricio and Norberto Rojas (2001).

Schady, Norbert (2001), "Do Macroeconomic Crises Always Slow Human Capital Accumulation?" *The World Bank Economic Review*, vol. 18, no. 2, pp. 131-154.

Skoufias, Emmanuel and Susan W. Parker (2005), "Job Loss and Family Adjustments in Work and Schooling During the Mexican Peso Crisis", *Journal of Population Economics*, (forthcoming).

Stephens, Melvin Jr. (2001), "Worker Displacement and the Added Worker Effect", *National Bureau of Economic Research* Working Paper # 8260.

World Bank (2001), "Income Risk, Household Coping Strategies, and Income Security Policy in Mexico" Report No. 22093, PREM Unit, LAC Region, Washington DC.

Appendix

This Appendix provides detailed estimates of the demographic contribution to the cyclical variation of employment (Table A.1), labor force participation (Table A.2) and unemployment (or employment Rate) (Table A.3). Column (1) in each of these tables simply reproduces the elasticity estimates of each measure reported in Tables 2-4, respectively. Column (2) presents the share in the total population of that age and gender group (based on the means for the sample period) while column (3) presents the product of the estimated elasticity with the population share. The numbers in column (4) present the ratio of the population weighted elasticity of each demographic group to the sum of the population-weighted elasticity across all demographic groups.

México:

Table A.1: Population shares and the shares of demographic groups in short-run variations in the employment to population ratio

Demographic group	Employment to pop ratio	Population share	Weighted elasticity	Share of total
Women		0.526	0.623	1.415
12-15	3.4261	0.059	0.203	0.461
16-19	-1.4526	0.062	-0.089	-0.203
20-24	-0.9071	0.072	-0.065	-0.148
25-34	0.9535	0.116	0.110	0.251
35-44	1.1489	0.089	0.102	0.233
45-54	2.3737	0.057	0.135	0.308
55-64	3.5990	0.036	0.131	0.298
65+	2.7154	0.035	0.095	0.217
Men		0.474	-0.183	-0.415
12-15	1.4651	0.060	0.088	0.199
16-19	-2.2299	0.060	-0.134	-0.304
20-24	-0.7741	0.066	-0.051	-0.117
25-34	-0.4039	0.101	-0.041	-0.093
35-44	-0.3661	0.078	-0.029	-0.065
45-54	-0.3455	0.051	-0.018	-0.040
55-64	-0.2134	0.031	-0.007	-0.015
65+	0.3140	0.027	0.008	0.019
Teenagers 12-15		0.119	0.290	0.660
Teenagers 16-19		0.121	-0.223	-0.507
Young adults 20-24		0.138	-0.116	-0.265
Adult women 25-64		0.298	0.479	1.089
Adult men 25-64		0.261	-0.094	-0.213
Older men & women		0.062	0.104	0.236
Total		1.000	0.440	1.000

Source: Author's calculations.

Table A.2: Population shares and the shares of demographic groups in short-run variations in the employment to population rate

Demographic group	Elasticity of LFPR	Population share	Weighted elasticity	Share of total
Women		0.526	0.896	0.924
12-15	4.0558	0.059	0.240	0.248
16-19	-0.2628	0.062	-0.016	-0.017
20-24	-0.0491	0.072	-0.004	-0.004
25-34	1.4573	0.116	0.168	0.174
35-44	1.4341	0.089	0.128	0.132
45-54	2.5567	0.057	0.146	0.150
55-64	3.7201	0.036	0.135	0.140
65+	2.7997	0.035	0.098	0.101
Men		0.474	0.073	0.076
12-15	2.0821	0.060	0.124	0.128
16-19	-1.0307	0.060	-0.062	-0.064
20-24	-0.0724	0.066	-0.005	-0.005
25-34	0.0151	0.101	0.002	0.002
35-44	-0.0629	0.078	-0.005	-0.005
45-54	-0.0009	0.051	0.000	0.000
55-64	0.1032	0.031	0.003	0.003
65+	0.5804	0.027	0.016	0.016
Teenagers 12-15		0.119	0.364	0.376
Teenagers 16-19		0.121	-0.078	-0.080
Young workers 20-24		0.138	-0.008	-0.009
Adult women 25-64		0.298	0.577	0.596
Adult men 25-64		0.261	0.000	0.000
Older men & women		0.062	0.114	0.118
Total		1.000	0.969	1.000

Source: Author's calculations.

Table A.3: Population shares and the shares of demographic groups in short-run variations in the employment rate (= 1-UR)

Demographic group	Employment rate (1-UR)	Population share	Weighted elasticity	Share of total
Women		0.526	-0.274	0.517
12-15	-0.630	0.059	-0.037	0.070
16-19	-1.190	0.062	-0.073	0.138
20-24	-0.858	0.072	-0.062	0.116
25-34	-0.504	0.116	-0.058	0.110
35-44	-0.285	0.089	-0.025	0.048
45-54	-0.183	0.057	-0.010	0.020
55-64	-0.121	0.036	-0.004	0.008
65+	-0.084	0.035	-0.003	0.006
Men		0.474	-0.256	0.483
12-15	-0.617	0.060	-0.037	0.070
16-19	-1.199	0.060	-0.072	0.136
20-24	-0.702	0.066	-0.047	0.088
25-34	-0.419	0.101	-0.042	0.080
35-44	-0.303	0.078	-0.024	0.045
45-54	-0.345	0.051	-0.017	0.033
55-64	-0.317	0.031	-0.010	0.018
65+	-0.266	0.027	-0.007	0.014
Teenagers 12-15		0.119	-0.074	0.140
Teenagers 16-19		0.121	-0.145	0.274
Young adults 20-24		0.138	-0.108	0.204
Adult women 25-64		0.298	-0.098	0.186
Adult men 25-64		0.261	-0.093	0.177
Older men & women		0.062	-0.010	0.019
Total		1.000	-0.529	1.000

Source: Author's calculations.