

Economic growth and gender inequality: an analysis of panel data for five Latin American countries

Alison Vásconez Rodríguez

Abstract

This study looks at the relationship between the feminization of the labour market — defined as a relative increase in the female labour force participation rate and in the female labour supply as measured in hours— and economic growth in five Latin American countries. On the one hand, these trends are reflected in the potential demand that labour force participation can channel into economic growth. On the other, the conditions under which women enter and remain in the labour market will determine their supply-side (i.e. cost-based) contribution to growth. Labour supply functions are calculated using the supply in terms of hours, feminization rates and estimated wages in dynamic economic growth functions. The results indicate that the feminization of the labour force bears a positive relationship with growth but that increases in the labour supply (as measured in hours) does not.

Keywords

Economic growth, gender, gender mainstreaming, women, women's employment, gender equality, econometric models, Latin America

JEL classification

B54, J22, J71, O40

Author

Alison Vásconez Rodríguez is Associate Professor with the Latin American Faculty of Social Sciences (FLACSO). avasconez@flacso.edu.ec

I. Gender inequality and economic growth: micro, meso and macro linkages

The conceptualization of the feminist economy raises two issues of interest in the debate concerning the micro/macro linkages between gender inequality and economic growth. The first is the idea that macroeconomic policies and events are linked with people and households, or percolate through to them, via a system of institutions —which include the State, the market and the community— that operates in neither a fully automatic nor a fully organized manner. This system functions within a gender-based framework that is founded upon power relations in which a visible, male-oriented policy approach dominates or influences an invisible, female-oriented one (Carrasco, 2001 and 2003; Elson, 1995a and 1999; Blau, Ferber and Winkler, 2002). The introduction of a gendered framework of considerations and factors sends out biased or skewed signals to the market, where, given the assumption that women workers are “expensive”, employers are reluctant to hire them or, once hired, to continue to employ them.¹ Employment decisions therefore entail a process of bargaining and conflict in which both material and immaterial factors wield influence. The end result of that process will permit or prevent those decisions from having a favourable outcome for women candidates in terms of both their participation in the market and the conditions governing their entry and continued participation in the workforce.²

The second issue has to do with the relationships between the market (the economic sphere) and households (the non-economic sphere). In this debate, it is posited that the process of accumulation uses “human energies” as merchandise, while housework reproduces these energies as part of a process that constitutes an integral component of the development of the members of the household. From the external perspective of the household, these energies are diverted from the reproduction of human beings to the production of merchandise. From the internal perspective of households, the production of merchandise is a means to an end, which is reproduction (Picchio, 2003). Viewed in this light, production and reproduction are part of the same continuous process. In fact, the core activity of the economy, according to these postulates, has been diverted from its central objective, which is the reproduction of life, which is in turn founded upon non-mercantile domestic work (Pérez, 2005; Carrasco, 2001).

Consequently, in order to gain an understanding of the characteristics of the labour market, the relationships between the two different spheres in which labour takes place must be considered together with, most importantly, the logic of housework, especially in the case of women, for whom domestic work often represents the sum total of their economic and labour-related activities. Women’s occupational modalities —which may be the outcome of both labour policies and labour relations— reflect the tension that exists between participation in the production process and its organization (Elson, 1995b), which has been “resolved” by resorting to labour flexibility, labour segregation and unequal wages for equal work.³ This leads to the intuition that tensions between the mercantile economy and what is known as the “unpaid care economy” are heightened during crises. Many such crises generate a growing demand for cheap labour that can be employed under flexible conditions in

¹ A number of studies have shown this to be a myth based on gender biases in the market. See Berger and Szretter (2002).

² On the subject of intra-household bargaining and conflict, see Agarwal (1997) and Sen (2000).

³ A majority of part-time workers are women (although the intensity of labour in the case of both men and women has increased substantially in recent decades). The women in this segment of the workforce are also employed under more flexible conditions, although not generally under the modality of “on call” workers (as is the case with men), and their employment also exhibits a greater degree of elasticity.

order to meet the needs of a recovering economy (Todaro and Yáñez, 2004), all of which works to the detriment of the quality of reproduction processes and the “quality” of the workforce.⁴

This may mean that the so-called “feminization” of the workforce —i.e. the increasing participation of women in the labour force— has an impact on business cycles via its influence on gender relations, in addition to having a beneficial impact both on women’s well-being and economic autonomy and on effective demand and growth.⁵ The influence of this process is channeled through at least two empirically verified mechanisms: (i) unpaid domestic work, which bears the cost of social reproduction; and (ii) paid work performed by women, who, on average, produce the same amount as men for less pay.⁶

These two mechanisms may generate differentiated effects during the business cycle via two channels (Darity, 1995; Erturk and Darity, 2000):

- A reproductive channel. Since unpaid domestic work generates a “savings” for the economy, the feminization of the workforce can have a negative effect if that savings is reduced (by paying for domestic work via private services or public services funded out of the government budget, since part of the value that domestic and care work transfers to the economy at no cost will no longer be channeled into the economic circuit but will instead increase the total wage bill).

This may have a positive effect, however, if, during crisis periods, households “substitute” unpaid work for expenditures (i.e. if the saving required in order for the economy to recover is afforded by domestic work, rather than by restrictions on fiscal spending or social benefits or unemployment-generated reductions in labour income) (Cerrutti, 2000).

- A labour market channel. The growing participation of women in the workforce could have a positive effect via a reduction in wage costs (a greater supply of labour at lower wages will cause average wages to decline) owing to gender-based wage inequalities.⁷

On the other hand, the effect of the pay gap and the downward pressure on average wages may have a negative impact on effective demand. Both of these effects may also occur at one and the same time, with the net effect being determined by the structure of the economy (Blecker and Seguino, 2002).

For Darity (1995), the effects transmitted through the reproductive channel may overshadow those transmitted through the labour market for poorer countries with fewer public caregiving services, while just the opposite would occur in richer countries. Along these same lines, Erturk and Cagatay (1995) have systematized a number of empirical studies on labour-market feminization and, following Rubery (1988), have identified three modalities for women’s entry into the workforce:

- A first modality is a procyclical buffer, in which female labour acts as a flexible reserve army that is drawn on more fully during growth periods and less so during recessions.

⁴ This detrimental effect could be mitigated by boosting the productivity of the unpaid domestic economy and by transferring (via mercantilization or socialization) some of the activities associated with that economy. The former is a trend that progresses at a faster or slower rate according to an economy’s income levels (and those of its component sectors). The latter is more strongly influenced by the point in the business cycle at which an economy finds itself and by the prevailing welfare regime. Nonetheless, paid care work is primarily performed by women and is generally poorly paid, which reflects the low value placed by society on reproductive activities. Access to these services is also determined by household income levels.

⁵ For further information on the debate surrounding growth theory as viewed from the standpoint of effective demand, see Dutt (1990), Lo Vuolo (2009) and Bhaduri (2007).

⁶ There is a wealth of evidence on gender pay gaps in Latin America. A number of these studies will be reviewed in a later section.

⁷ At the global level, the feminization of the workforce and the employment conditions associated with that process have given rise to structural inequalities in international labour markets and to increasing informalization as a result of the demand for capital (see Benería, 2005 and 2008).

- A second modality is a segmented one in which there are sectors in which women are overrepresented and the impact of economic recessions or booms on the composition of the workforce (the entry or departure of women) depends on the composition of the sectors and occupations associated with a given stage in the business cycle. This feminized structure “protects” women who are the first to leave the market during recessions. In this sense, this modality entails a countercyclical form of behaviour.
- A third modality is one in which female workers are substituted for male workers during crises, when households’ main breadwinners may be unemployed or underemployed. By the same token, the market may tend to coopt people who have lower salary expectations but who can perform similar work in order to reduce costs during recessions. The existence of gender inequalities may bolster an economic recovery if their effect on costs outweighs the negative implications of inequality in terms of effective demand.

This article is composed of five sections, the first of which is this introduction. The second section contains a review of the literature on the links between growth and gender inequality. The third covers the methodology used in this study, while the fourth presents the results. The fifth and final section concludes.

II. The literature on growth and gender inequality

There are two main types of studies on gender inequality and growth. The first focuses on inequality in terms of human capital, particularly education, while the second focuses on employment and labour income.

There is an extensive collection of research papers which show that gender-based inequalities in education retard long-term growth and that there is therefore a positive relationship between women’s education and economic growth (Dollar and Gatti, 1999; Klasen, 2002). These researchers’ interpretation of their findings indicates that, when men and women have the same endowments and an equal distribution of skills and abilities, the existence of inequality will lead to the exclusion of potentially highly skilled women and to the inclusion of less skilled men. If women are excluded by providing them with less education and if men are given greater access to education, then, in the presence of decreasing returns, educating girls will yield a greater return at the margin. This body of research focuses on one of the foundational principles of the theory of human capital, which holds that there is a direct correlation between investment in education and economic growth. This, in turn, is based on the intuition (which has not been rigorously tested) that (formal) education augments productivity. This theory has been brought into question by those who argue that productivity is not observable and that income levels, as well as employment demand, entail gender biases that are unrelated to educational level. Thus, although these studies’ findings do show that educational inequality may be detrimental in terms of growth (since potentially skilled labour is being lost), they do not necessarily demonstrate that, if women invest in education (or attain a higher level of education), they will have higher levels of income or will gain access to higher-productivity jobs.

Another type of impact of educational inequality for which there is empirical evidence has to do with the externalities that the education of women generates in terms of lower fertility rates, lower infant mortality rates and increased educational opportunities for the next generation (Cavalcanti and Tavares, 2007). High birth rates may also reduce long-term savings rates and levels of investment in education and health (Klasen, 2002; King and Porter, 2010). These conclusions are quite intuitive, since, in most studies, the last of these variables (future education) has not been included and the first variable may be subject to problems of endogeneity that have not been sufficiently controlled for.⁸ On

⁸ Aguero and Marks (2008) and Cruces and Galiani (2007), among others, have done research on the relationship between fertility and the female labour supply.

the other hand, most of these studies use cross-sectional regressions and implicitly assume that the influence exerted by gender inequality is similar in all countries while ignoring their differing structural characteristics. The inclusion of panel studies improves this type of research substantially, and some authors (Klasen and Lamanna, 2009; Klasen, 2006) have therefore introduced panel data in updated versions of their studies. In such cases, their findings remain essentially the same, but their results are more robust.

Another line of research has focused on the impact of gender-related factors on competitiveness. These studies suggest that, in economies specializing in exports that are intensive in female labour, the education of that sector of the workforce is a key factor in boosting competitiveness. And, indeed, a high correlation between the education of women and exports (and, hence, economic growth) has been found (Seguino, 2000). There is little empirical evidence for this line of argument, however, mainly because there is an information problem with regard to competitiveness and domestic productivity. In agricultural economies, the effect of gender-related factors on growth is more closely linked to inequalities in landownership and access to credit than to inequalities in education (Blackden and Bhanu, 1999; Doss and Morris, 2001). In these cases, the most informative indicators for gender inequity are differentials in primary education, access to credit and property rights.

Studies on wage and employment inequalities are fewer in number, and their results have been formulated within differing theoretical frameworks, all of which has given rise to an extensive debate on the subject. Some of these studies focus on long-term determinants of productivity growth and supply, while some of them model the maximization of producers' profits based on the selection of a suitable level of human capital, whose availability is reduced by the failure of potentially productive people to enter the market (Esteve-Volart, 2004). These studies take the non-inclusion of women in employment as a distortion that reduces the total sum of talent, in the case of employees, and lowers productivity, in the case of unequal access to technology and other production resources (Blackden and others, 2007).

Klasen (2002) and Klasen and Lamanna (2009) have developed economic growth models in which variables representing gaps in participation and education are introduced sequentially in order to measure their indirect effects using equations that trace the links between these gaps and a number of determinants of growth, such as investment. They are unable to determine, however, whether the effect of equity on the distribution of growth stems from the boost given to earnings by the relatively low wages paid to women (whose entry into the workforce may lower average wages and, hence, reduce what is known as the "efficiency wage"). Whether or not increases in women workers' productivity will actually translate into unbiased wage increases will depend on structural aspects of the economy and its institutions which may reduce or heighten women's wage bargaining power.

Thus, wage gaps are a plausible source of the relationship between gender inequality in employment and growth. Employment gaps, in the presence of lower wages for women, can reduce growth because the opportunity for using cheaper labour as a competitive advantage is lost (Seguino, 2000). In this case, wage inequality — rather than equality — is efficient. This fits in with the evidence on growth in some countries, including those in Latin America, that have experienced periods of growth coupled with inequality, declines in real wages or unemployment (as in, for example, the Andean countries during the early 2000s). There are not enough empirical studies to provide solid backing for this line of reasoning, however.

Another line of research has centred on the demand-side effects of wage and employment inequality in both the short and long terms (Erturk and Cagatay, 1995; Blecker and Seguino, 2002). These studies focus on the structural traits of economies that influence the interaction between gender relations and macroeconomic aggregates. They indicate that, in semi-industrialized countries, wage differentials may provide a stimulus for two major economic aggregates: investment and exports (Seguino, 2000 and 2010). In developing countries that rely heavily on exports to finance their imports

of capital goods, female labour has been one of the main sources of exchange rate gains and one of the main reasons for the relaxation of external constraints (thanks to increases in competitiveness).

Some authors have attempted to incorporate gender-based differences into growth models and particularly into differentiated labour supply matrices that reflect the dependence of caregiving activities and the tendency to segregate women workers by diverting them into highly labour-intensive activities in commodity export sectors. Along these lines, Blecker and Seguino (2002) have found that higher wages may spur aggregate consumption (assuming that women workers have a greater propensity to consume than investors do) and aggregate demand. Higher wages can also, however, drive price increases for exports, whereupon export demand will decline. In addition, high wages reduce profits, which may dampen investment. This negative demand effect (on exports and investment) can potentially outweigh the positive effect on consumption, especially if exports are price elastic (as in the case of commodities).

In addition to wage competition, another possible linkage with growth in export-led economies may exist when women are also employed primarily in food production sectors (domestic agriculture), since the lower wages paid in these industries may translate into lower food prices. This will lower average wages in the economy as a whole and boost its competitiveness (Kucera, 2002) and may thus have a positive impact on exports. A more thorough analysis of this and other possible channels for gender-related impacts would require a broad sample of countries and detailed information on their internal demand structures.

Both the evidence and intuitions provided by these studies indicate that growth can have contradictory effects on gender equity: gender inequality may spark upswings in some economic aggregates but may also have a dampening effect on others, such as consumption, if demand effects are strong (Stotsky, 2006; Berik, Rodgers and Seguino, 2008; Braunstein, 2008). Efforts to raise women's wages in the interests of greater equity may lead to growth in a non-profit-led economy, but they may also spark an economic contraction as a result of their negative effects on investment and exports. These short-term disturbances in demand may not only reduce male employment and output but may also make it difficult to achieve long-term growth. Thus, even though gender equity may have positive supply-side effects on the quality of the labour force over the long run, in the short run gender equity may generate shocks that could push economies off their long-run growth paths. Further analysis of the duration of these departures from the long-term trend is called for (Berik, Rodgers and Seguino, 2009).

In this study an effort will be made to determine the nature of the relationships between economic growth and the feminization of the workforce (as defined by women's labour force participation rate) in a number of Latin American countries based on the approach devised by Erturk and Cagatay (1995) described in section I. These authors posit that, when activity levels are low (or when an economy is in a recession), the rate of feminization rises and becomes countercyclical. As this trend unfolds, feminization stimulates investment (since wages are low and these workers have limited bargaining power — a situation that generates pay gaps). As investment strengthens, it drives up the initially low equilibrium point. At the same time, the intensity of female household labour will have an impact on household saving as households reduce their expenditures on caregiving services. If, at the base of the cycle, the latter effect overshadows the impact of paid labour, then the feminization of the workforce will put downward pressure on the utilization of production capacity and will deepen the recession. The opposite will occur if, when the economy is contracting, the positive impact of the feminization of the workforce on investment is stronger than the impact that the rising intensity of female household labour has on savings.

These propositions are taken up in the present study. Nevertheless, based on the empirical evidence for Latin America (Contreras, Armas and Vásquez, 2008; Vásquez, 2012; Esquivel, 2005), it is assumed that, although labour force participation is countercyclical and household labour exhibits

greater intensity among the lower-income population, which has less access to private caregiving services, it is less clear what actually occurs during economic recoveries and what influence the feminization of the workforce actually has on the business cycle. Since the way in which the intensity of household labour responds to economic recessions cannot be empirically verified, it will be assumed, in the absence of historical data, that the feminization of the workforce in terms of intensity (hours worked), within a certain range, is substituted for the time spent on care work, and this may result in the dissaving described earlier. While this study will focus on the relationship between the feminization of the workforce and economic growth, and while it will not make use of data series on the amount of time devoted to household labour, the number of hours worked will be used as a proxy variable for the relationship between work in the labour market and domestic work with a view to arriving at an intuitive conclusion regarding the behaviour of the labour supply in overall terms. The results will provide information on the so-called “market channel” that forms part of this conceptual framework.

III. Methodology

The labour supply, in individual terms, is determined by the offered wage and the reservation wage, which takes into account the time spent providing care and the available time of other earners. In other words, a given person will join the active workforce when the wage offered exceeds that person’s reservation wage. Suppose that, in a nuclear family, the point at which person m will accept paid work is related to the wage received by that person’s partner h .

$$H_m = 0 \quad \text{si} \quad w_m < WR_m \quad (1)$$

$$H_m = H_m(w_m, WR) \quad \text{si} \quad w_m > WR_m \quad (2)$$

Where $WR = WR(p, Td_m, y/p, w_h(T - Td_h))$ is the reservation wage, which incorporates both the offered working conditions and those of the “other earner” and is the result of a joint decision. H_m is the labour supply as described in (3) and ε_m is the residual.

Since only the wages of persons who are participating in the labour force can be determined, there is a sample selection bias. Thus, in order to measure the labour supply while correcting for this bias, a three-stage Heckman selection model is used.⁹ First, the selection bias is calculated using a reduced participation model (i.e. without any wage). Using a general wageless labour supply function in line with Heckman (1976 and 1993), this bias is given by the ratio of the probability density function to the cumulative distribution function for the labour supply in its reduced form. This ratio is also known as the inverse Mills ratio (or lambda, λ), whose mean values are a proxy variable for the existence of labour-market entry barriers. With the inclusion of the bias, the wage can be calculated using the inverse Mills ratio as a regressor:

$$\hat{w}_i = X_i\beta + \theta\lambda_i + \nu \quad (3)$$

The third step is to use a least squares regression to estimate the labour supply, since the supply is being measured in hours and includes the estimated wage. The formal specification, with separate models for men (m) and women (f) is as follows:

⁹ For a discussion of the different types of labour supply models, see Berndt (1990), Killingsworth (1983) and Blundell, MaCurdy and Meghir (2007).

$$H_{fi} = \beta_f + X_{fi} \beta_{1,f} + Z_{fi} \beta_{2,f} + D_{fi} \beta_{3,f} + Y_{fi} \beta_{4,f} + w_f \eta_f + \varepsilon_{fi} \quad (4)$$

$$H_{mj} = \beta_m + X_{mj} \beta_{1,m} + Z_{mj} \beta_{2,m} + D_{mj} \beta_{3,m} + Y_{mj} \beta_{4,m} + w_m \eta_m + \varepsilon_{mj} \quad (4.1)$$

Where X, Z, D and Y are vectors of human capital, working conditions, demographic factors and income, while w is a wage vector.

For the probability model, it is necessary to calculate the marginal effects given by $\partial H/\partial \ln w$, which shows the change in the probability of participation caused by a percentage change in the wage (which is not characterized by direct elasticity). The sum of the estimated probabilities as a proportion of the total working-age population gives the net participation rate, estimated at the aggregate level. The elasticity is the ratio of the percentage change in the wage over the change in this rate.

Once the participation rates have been obtained, the next step is to calculate the feminization indicator, which is the ratio of women's participation to men's participation. These variables can then be used to construct three growth models using the GDP growth rate as a dependent variable and including, alternatively, the variables for labour-market feminization and hours of work. Variables for increases in labour intensity, wages and education gaps are also included, in line with other studies covered in the literature review. Given the endogeneity of the relationship between inequality and growth as outlined in the theoretical framework, these problems are corrected for by lagging the explanatory and dependent variables, as well as by using the differences between the values for previous periods in keeping with the generalized method of moments.

This approach to the analysis of the relationship between growth and gender inequality, as well as the causal relationship posited in the conceptual framework, calls for an exploration of the linkage between gender gaps in the labour market and their implications for economic growth (represented, in this case by GDP growth). It is therefore best to include variables that incorporate their previous values, especially in the cases of interest for this analysis. While it is not a question of undertaking a convergence analysis, this study starts off with a dynamic autoregression model in order to shed light on its implications in an econometric panel model and then, starting from there, other lagged variables are incorporated in order to provide an explanation within the framework of the model to be used in this study.

In this study, a non-autoregressive dynamic panel model will be used in which the dependent variable is the quarterly GDP growth rate for each country. Four groups of explanatory variables are proposed:

- (i) Growth-related macro variables¹⁰
- (ii) Labour-market variables
- (iii) Gender-gap variables
- (iv) Country variables

Three specifications may be proposed. In the first, the macro variables include lagged GDP growth, investment as a percentage of GDP and the expansion of human capital as measured by the mean level of educational attainment of the economically active population (EAP). Labour-market variables include the growth of the labour supply (in hours) and the average wage. Country proxy variables, in combination with the rate of feminization, are also included in order to focus on individual effects. In the second specification, controls are introduced for the macro variables as a group in the form of the lagged levels of economic openness and industrialization; the control for the labour-

¹⁰ These variables were selected on the basis of a number of studies on growth estimates (Barro, 2000; Ros, 2004) and some of the studies included in the literature review.

market variables is the increase in wages, while the control for human capital is the gender gap in educational attainment. Finally, the model is completed with the introduction of two variables specific to the situational context in each country: one corresponding to periods in which there was a change of government (such changes occurred in all the countries except Brazil during the study period (2003-2010), so this variable was not used for that country) and crisis periods, which occurred in 2003 in Argentina and Uruguay and in the second and third quarters of 2009 (the most recent financial crisis) in all the countries.

First, a Hausman test is conducted in order to check the fixed effects. The results yield a statistical value that is quite a bit lower than the chi-squared statistic, and the null hypothesis that there is no significant difference between the two types of models is therefore ruled out (see annex A1). This means that the explanatory values and the effect itself are correlated or, in other words, that cross-country differences are a key factor in accounting for the behaviour of the dependent variable.

Next, in line with the methodology outlined above, the pooled ordinary least squares (OLS) model is run to verify the upper limit of the estimator. The within estimators are then obtained, with variables in differences and without the inclusion of moment instruments for the independent variables.

Finally, the model is run using the generalized method of moments (MGM SYS). The formal specification is:

$$Y_{it} = Z_{it}'\beta_1 + G_{it}'\beta_2 + L_{it}'\beta_3 + D_i'\beta_4 + P_{it}'\beta_5 + \varepsilon_{it} \quad (5)$$

Where Y_{it} is the economic growth rate, Z_{it} is the macro variables vector, G_{it} is the gender variables vector, which includes the variables of interest, L_{it} is the vector of labour-market conditions, D_i is composed of the proxy country variables combined with their feminization rates, and P_{it} represents the proxy variables for exogenous factors (crises and changes of government). The following considerations with regard to the various instruments should be noted:

- Endogenous variables: Feminization of the labour force and its growth rate (given that a bidirectional relationship exists between growth and inequality), increase in labour-market feminization, wage increases during the preceding period and pay gaps. These variables are instrumentalized by differences and level. The verification of endogeneity is conducted by means of a regression, in reduced form, of these variables for economic growth (see annex A2). In macroeconomics, this specification is used in order to highlight a cause-effect relationship, since the explanatory variables have been lagged and differentiated in order to overcome the endogeneity caused —in this case— by the bidirectionality of the relationship (which has been found to exist in the studies discussed above). The interpretation, after testing for the absence of endogeneity, can be based on the fact that a change in the labour-market feminization variable has a given effect on the rate of economic growth.
- Predetermined variables: Investment rate, level of educational attainment of the EAP and gender gaps in educational attainment. These variables are instrumentalized by differences. In order to select weakly exogenous variables, the same test as in the preceding case is used (see annex A2).
- Lagged exogenous variables: The macro variables of the investment rate, economic openness and the degree of industrialization. These lags are included as their own instruments.
- Current exogenous variables: Proxy variables.

The variable of interest is the indicator of labour-market feminization. The Arellano-Bond test for second-order autocorrelation and the Sargan test for overidentifying restrictions are both performed.

1. Data sources

The macro data on growth are obtained from two sources: (i) the Penn World Table (PWT 7.0) database; and (ii) CEPALSTAT. Quarterly data for the period from 2003 to 2010 for use in the models were obtained from the statistical compendium entitled “América Latina y el Caribe: series históricas de estadísticas económicas 1950-2008” (ECLAC, 2009b), CEPALSTAT and the countries’ statistical offices (for both constant and current values, which are then used to provide all the information in constant 2000 dollars). The heterogeneity of the countries covered in this study introduces a greater degree of variability, making these sample data an interesting subject for analysis.

In order to derive the estimated wage and labour supply, microdata from household surveys in five countries (Argentina, Brazil, Ecuador, Peru and Uruguay) were cross-checked. These countries were selected to reflect the diversity found in South America: Ecuador and Peru, in the Andean region, have similar social features but quite different economic traits; Argentina, Brazil and Uruguay are all in the Southern Common Market (MERCOSUR) area, and Argentina and Uruguay have economies that are more or less on a par in the sense that they have fairly high income levels, but their poverty rates and distribution patterns are quite different, while Brazil is a middle-income country with a high growth rate, very high poverty levels and a severely skewed distribution pattern. This group of countries was also selected because its members have widely varying feminization/per capita GDP ratios, which sets the stage for interesting inferences at both the group and individual country levels. Microdata from the complete series of monthly employment surveys for 2003-2010 for urban areas were also obtained. However, seasonally adjusted quarterly data were used in order to attain a sufficient degree of variability relative to the macro variables. These results were used to derive a 32-period panel database for each country corresponding to the quarters comprising the period 2003-2010.

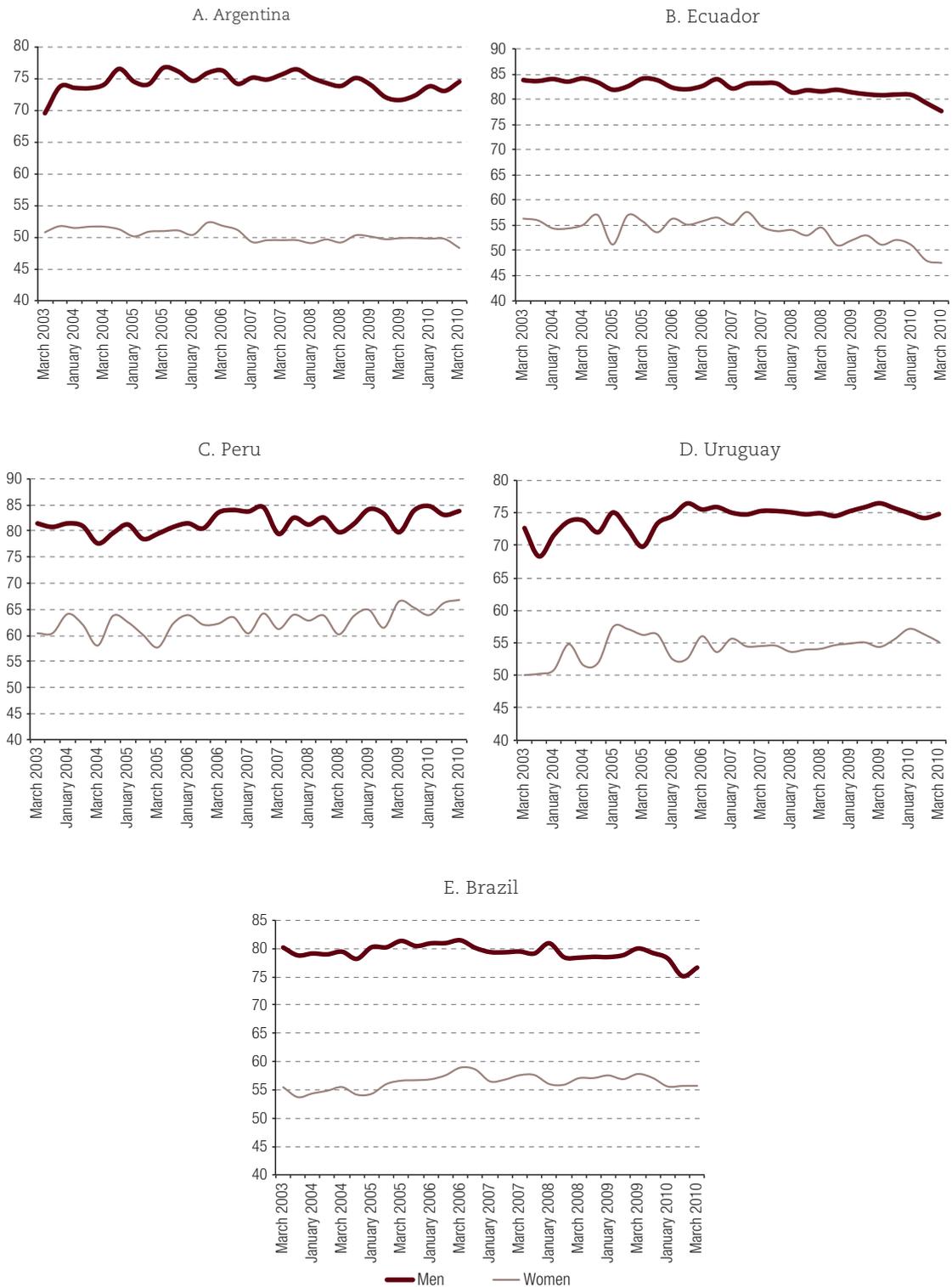
IV. Results

Figure 1 gives the labour supply estimates. The trend for 2003-2009 shows a rise of two points, on average, in the female labour force participation rate for Brazil, Ecuador and Uruguay and a comparable decline in Argentina and Peru.

In line with the conceptual framework being used here, the two-stage calculation of labour force participation rates makes it possible to analyse the selection bias using the inverse Mills ratio (λ), which is related to the non-selection hazard rate. The results make it possible to infer that the values of λ are greater for women than for men (1.5 to 1, on average, for Argentina, 4 to 1 for Ecuador and Uruguay, and 2.5 to 1 for Peru). These ratios are constant throughout the period under study for Argentina, decline in the cases of Ecuador and Peru, and climb in the cases of Brazil and Uruguay, with an increase in the coefficient for women between 2007 and 2010 —a period during which unemployment was also on the rise (see figure 2).

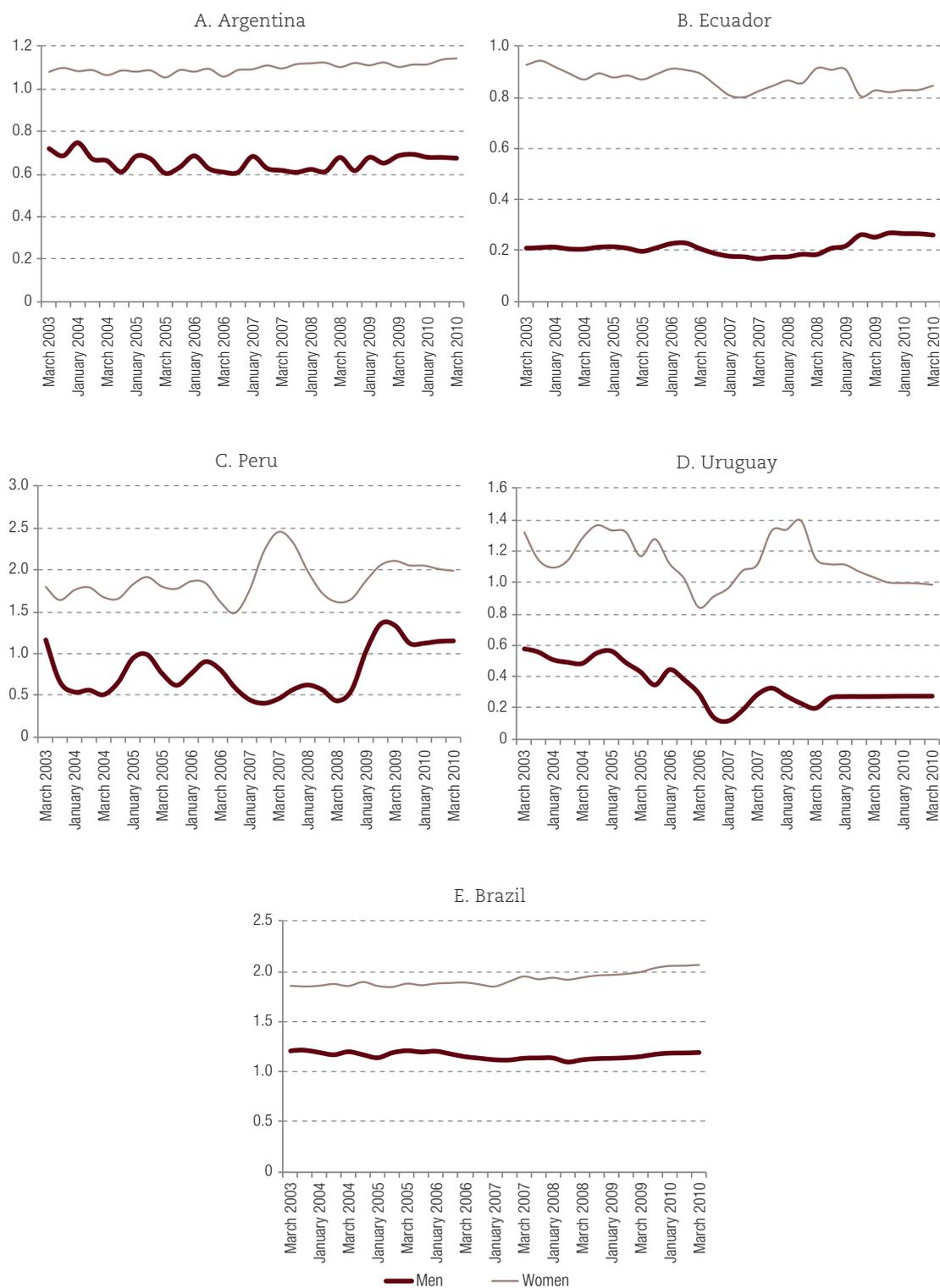
The highest lambda values for women during the period under study were found in Brazil and Peru, but this is not reflected in the labour force participation rates for these countries (since these countries are not the ones with the lowest participation rates). This means that, while the female labour supply is large in proportion to the size of the working-age population, a substantial part of the non-participation rate is accounted for by selection factors, indicating that there is a larger potential labour supply than in other countries. This may be in line with the hypothesis advanced by Erturk and Cagatay (1995), who posit the existence of greater labour force participation intensity in both high- and low-income countries. The lowest lambda values are found in Brazil even though the gap in terms of male selection is the highest. This may have to do with the high value for the labour supply of workers, that has remained at nearly 80% over the last decade.

Figure 1
Labour force participation estimates
(Percentages)



Source: Prepared by the author.

Figure 2
Estimated values of λ_h, λ_m (selection bias)



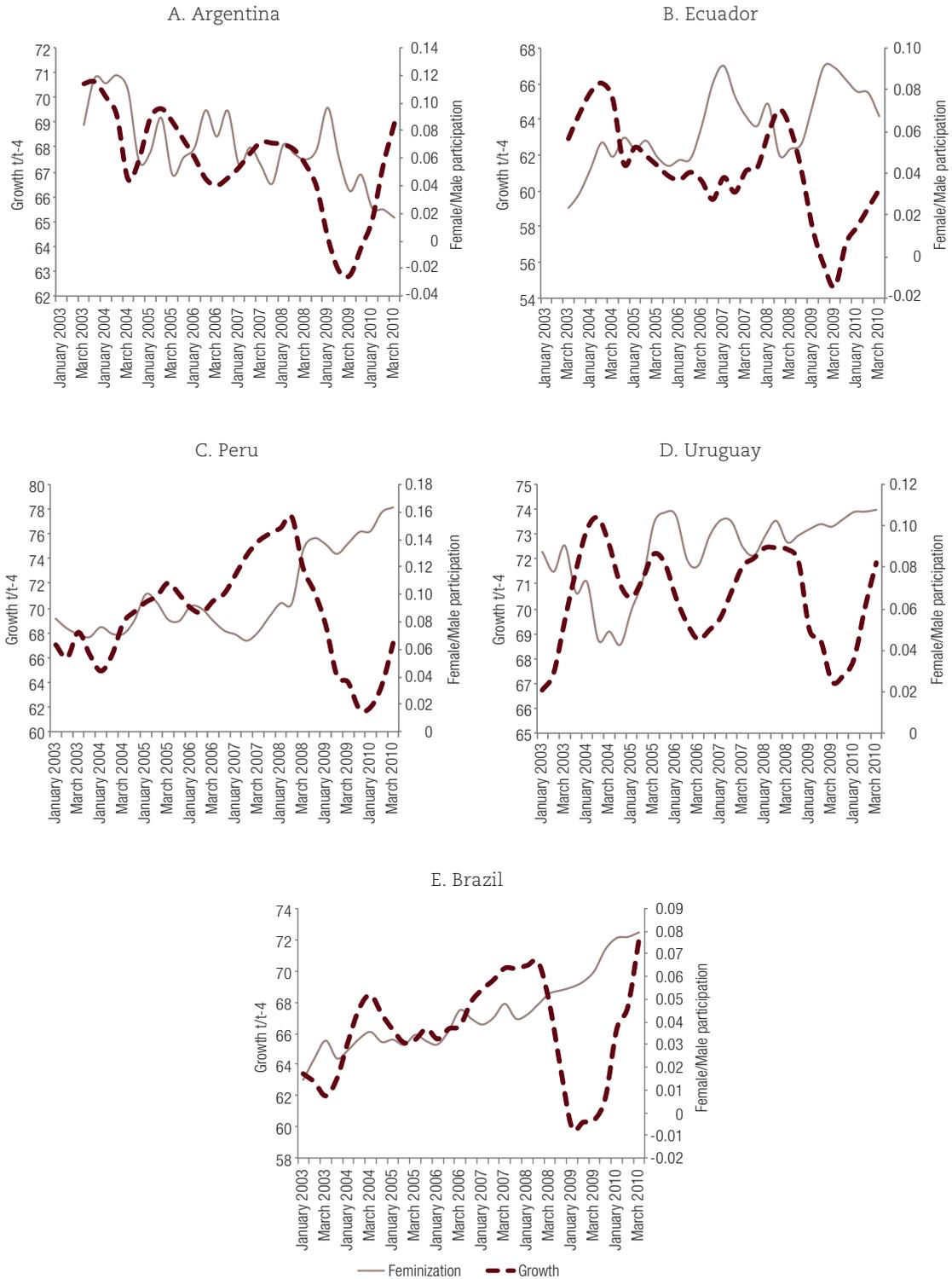
Source: Prepared by the author.

Selection bias tends to move in the inverse direction from unemployment in the case of women, while the opposite is true for men. It is thus more difficult for women to enter the workforce when unemployment levels are on the decline (i.e. when there is a greater likelihood, *ceteris paribus*, of finding work or when jobs are being created). By the same token, there are more people entering the workforce, lower entry barriers or more people deciding to enter the labour force (a relative reduction in reservation wages) when unemployment is on the rise, which may be because the economy is slowing down. Just the opposite occurs in the case of men, for whom λ values move in step with unemployment, which indicates that the male labour supply changes in response to specific employment opportunities. These trends, for both men and women, became stronger towards the end of the period under analysis when there were sharp changes in male and female unemployment, especially in Argentina and Ecuador (ECLAC, 2009a).

Figure 3 gives estimates for the feminization of the labour market (the ratio of the estimated female and male labour force participations rates), which reflect a reduction in this indicator during the first five years of the period under analysis. During those same years, the female labour supply in Peru, Uruguay and Brazil was expanding. Starting in the third quarter of 2009, the feminization rate was climbing in all the countries except Ecuador, but that rate of increase began to level out only in Argentina, where it hovered around 67%. There were large fluctuations in the other countries, with the highest rate by the end of the period being recorded for Uruguay (75%) and the lowest for Ecuador (61%) owing to that country's high male labour force participation rate. The gap in the male/female labour supply averaged around 22 hours/week except in Ecuador, where it averaged 30 hours throughout the period under study. In Brazil, the upward trend in feminization was similar to the trend in Uruguay, but was even sharper and was in step with GDP growth up to 2008. A closer scrutiny of these two variables reveals opposite trends, however, especially in the closing years of the period under consideration. This may point to the presence of a countercyclical trend, which would have to be verified on the basis of a longer period of observation.

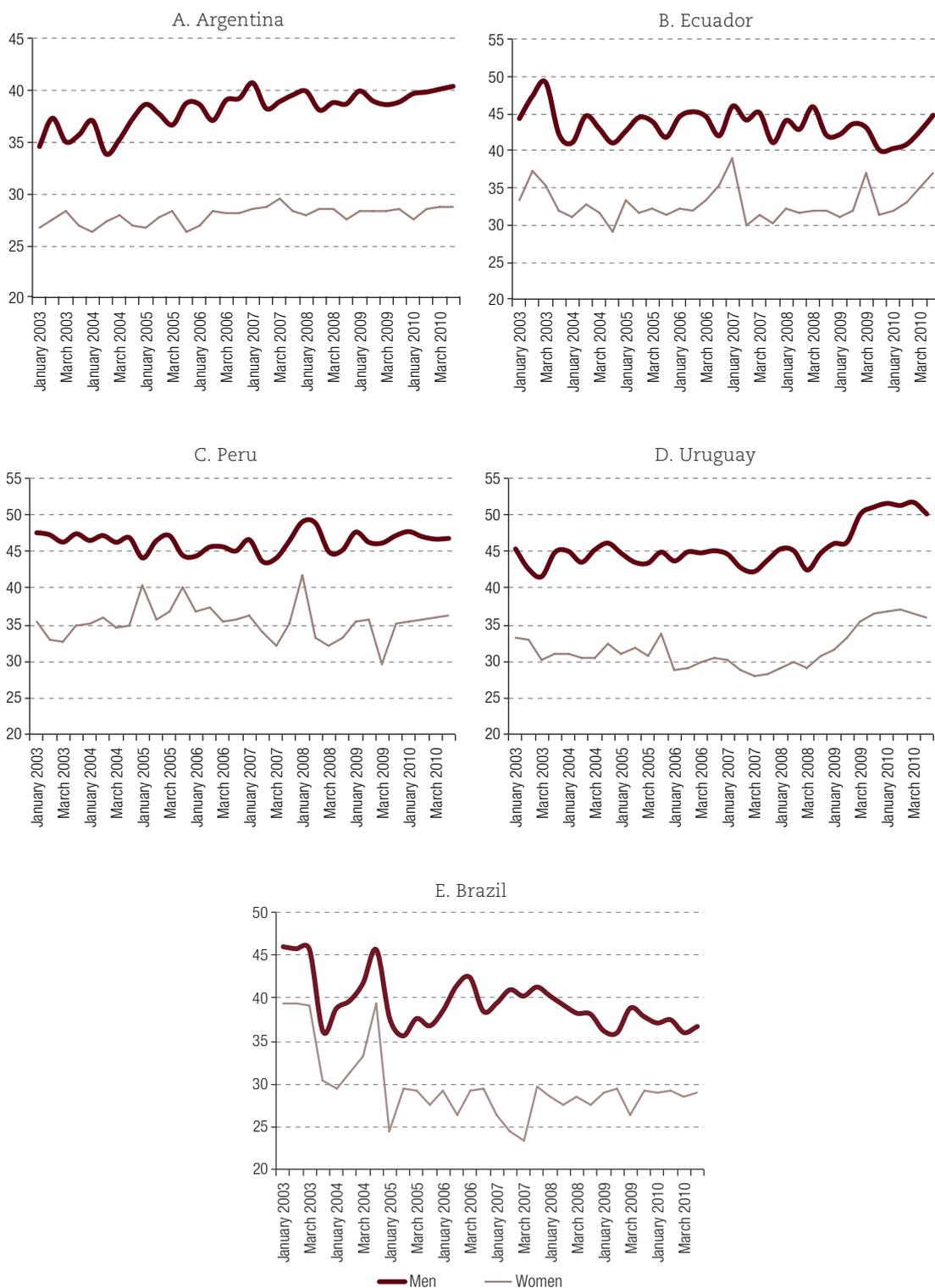
An increase in the number of persons in the labour market does not necessarily translate into a change in the labour supply in terms of available hours of labour. The average estimated working day for women corresponds to part-time work, which fits in with the high rate of underemployment recorded for the female population. In fact, the increases in the labour force participation rate registered for some time periods are paired with decreases in the labour supply measured in hours of work per week. The greatest intensity of male labour was found in Peru (around 50 hours per week), with that figure falling by 5 hours, on average, between 2005 and 2007 (see figure 4). The corresponding average for Uruguay also exceeds a standard work week (around 45 hours per week throughout the period under analysis). The lowest coefficients were found in Argentina and Brazil, especially between 2003 and 2006 (27 hours per week, on average). In this last case, the coefficient for labour intensity rose for men and decreased for women.

Figure 3
 Estimated feminization of the labour market and GDP growth
 (Percentages)



Source: Prepared by the author.

Figure 4
 Estimated labour supply
 (Hours per week)



Source: Prepared by the author.

The results of the previously described models for the relationship between labour-market feminization and economic growth are presented below, with the third specification of the method of moments (GMM SYS)¹¹ being judged to be the most valid one for correcting for weak exogeneity and endogeneity.¹² These estimates confirm the existence of a significant relationship between feminization (measured in terms of the quotient between female and male participation rates) and the economic growth rate. The results are given for all the countries and periods analysed, since this is a panel model. Country-specific variables are also included, however, so that individual effects can be detected.

Table 1 shows that a 1-point increase in the feminization rate is associated with a 5.9% increase in GDP growth. This effect remains and grows stronger over the medium term, since the lagged feminization variable for one period has an effect equivalent to 7.7% on the growth rate. This is considered to be a robust result given the stability of both the coefficient and the standard error in all three specifications. This provides a partial confirmation of the hypothesis that, in the presence of a pre-existing gap in labour force participation, women's entry into the workforce can help fuel growth or a recovery if an economy is in a recession or when its existing capacity is being underutilized. In other words, a reduction in participation gaps has a positive growth effect over the short and medium terms.

In Ecuador, the trend in feminization during the period under study was confirmed by the result obtained using the model for the group. The fluctuations in this indicator moved in the opposite direction of the fluctuations in the growth rate, however. This leads to the inference that, while women's participation in the labour force as a whole has a positive impact on the growth rate, their participation increases more rapidly when the economy is slowing down. In addition to the fact that feminization contributes to growth, when there is a sharp slowdown, such as occurred in the second and third quarters of 2009 or the early months of 2010 in some countries, and male unemployment is higher, the response of the female labour supply is positive. If this result is found to hold true over the long term, it could provide corroboration for the theory advanced by Erturk and Cagatay (1995) regarding the relationship between a high rate of feminization and long per capita income levels.

In Uruguay, the recovery that began in the second quarter of 2003 ushered in a steady growth trend that has been less affected by the recent crisis than has been the case in the other countries, and the rise in women's labour force participation rate has continued to outstrip the increase in the male participation rate (Espino and Azar, 2005; Espino, Leites and Machado, 2009). Thus, the participation gap is narrowing and the feminization rate is climbing, which is in keeping with the result of the model. However, the unemployment gap widened in 2007 and 2008, which means that the rise in participation has not been balanced out by employment.

In Brazil, the overall behaviour of the labour market indicates that, during the recent economic boom, the female labour force participation rate continued to rise, but selection biases remained in place and even increased towards the end of the period. In addition, wage gaps widened and unemployment fell, indicating that opportunities for entering the workforce and for obtaining employment increased, but only in the case of part-time work. Thus, the results in terms of the feminization of the workforce are positive both for women entering the labour market and for economic growth, but entry and employment conditions may not be favourable for women, and widening gaps and shrinking average wages could impact growth in the short run.

¹¹ That is to say, instruments obtained using the generalized method of moments. For a detailed explanation of the justification for using this model, see Martín (2008).

¹² The Hausman test for fixed or random effects yielded statistical values that indicate that we are dealing with a fixed effects model, so the methodology outlined earlier can be used in this case. Table 1 gives the results for the variables of interest when pooled ordinary least squares and intragroup fixed effect estimator regressions were run. The other variables are given in the detailed model set out in annex A3. The Arellano-Bond test for autocorrelation does not rule out the null hypothesis of the absence of this phenomenon for the second order difference equations, which justifies the use of moment instruments. The Sargan-Hansen test demonstrates the absence of overidentification. Reduced forms were also run to gauge the explanatory power of the additional instruments (lags and differences) for the variables of interest. The F values that were obtained corroborate the instruments' validity.

Table 1
Labour-force feminization panel results

Dependent variable: GDP growth $t/t-4$	Pooled ordinary least squares			Fixed effects intragroup panel (1)			GMM SYS panel (2)									
	Specif. 1	Specif. 2	Specif. 3	Specif. 1	Specif. 2	Specif. 3	Specif. 1	Specif. 2	Specif. 3							
Feminization (f)	0.054	0.091	0.009	0.000	0.043	***	0.054	***	0.066	*	0.057	**	0.055	**	0.059	**
	0.080	0.072	0.088	0.015	0.015	0.021	0.021	0.037	0.037	0.024	0.024	0.025	0.025	0.026	0.026	0.026
Feminization (Q-1)	0.019	0.022	0.020	0.034	0.000	0.034	0.000	0.028	0.000	0.073	*	0.079	**	0.077	**	0.077
	0.075	0.081	0.080	0.071	0.065	0.072	0.065	0.072	0.040	0.040	0.039	0.039	0.037	0.037	0.037	0.037
Feminization (Q-2)	0.041	0.041	0.038	0.034	0.034	0.028	0.034	0.028	0.040	0.040	0.039	0.039	0.037	0.037	0.037	0.037
	0.198	0.231	0.203	0.071	0.065	0.072	0.065	0.072	0.193	0.193	0.224	0.224	0.197	0.197	0.197	0.197
Autocorr (1) (p value)											0.054	0.035	0.016	0.016	0.016	0.016
Autocorr (2) (p value)											0.890	0.723	0.410	0.410	0.410	0.410
Sargan-Hansen (p value)											0.126	0.503	0.937	0.937	0.937	0.937

Source: Prepared by the author.

Note: * significant at 90%; ** significant at 95%; *** significant at 99%.

(1) *Instruments for equation in differences*

Standard: D.investment_gdp LD.investment_gdp D.feminization LD.feminization D.incr_hours_m LD.incr_hours_f D.incr_wage_Q4 LD.incr_wage_Q4

D.openness LD.openness D.manufacturing LD.manufacturing D.recession D.educ_gap D.educ_attainment_eap

(2) *Instruments for equation in differences*

GMM: L(2/.)L(2/.) investment_gdp L(2/.) feminization L(2/.) escolaridad_pea L(2/.) incr_hours_f L(2/.) incr_wage_Q4 L(2/.) educ_gap

Standard: D.openness LD.openness D.manufacturing LD.manufacturing D.d_recession

Instruments for levelling equation

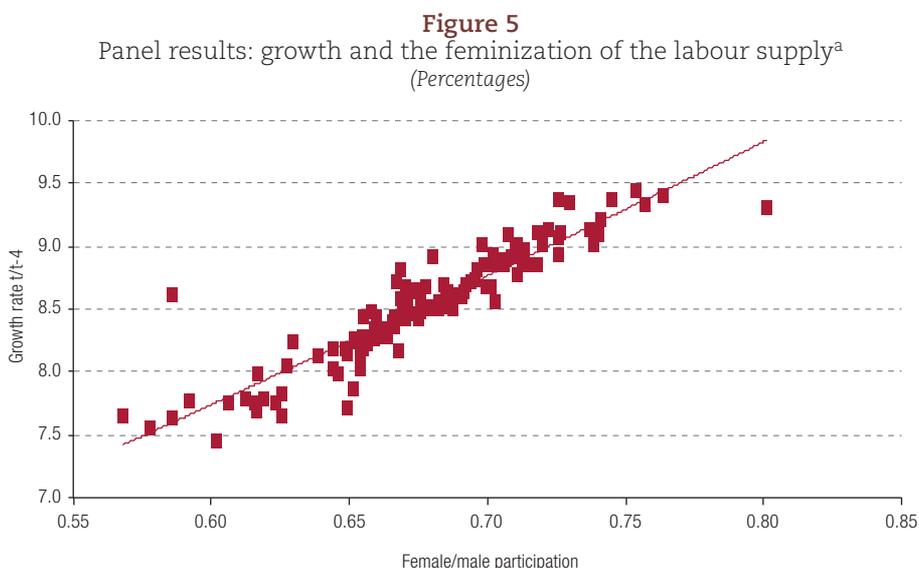
GMM-LD.investment_gdp LD.feminization LD.educ_attainment_eap LD.incr_hours_f LD.incr_wage_Q4 LD.educ_gap

The group results for Argentina and Peru were strengthened by the inclusion of country-specific feminization variables, for which there is a significant positive correlation with the growth rate. In the first case, an increase in the feminization rate boosts GDP growth by 4.7%. This finding is in line with recent studies on the situation in the country since the end of the convertibility regime (Rodríguez, Esquivel and Espino, 2012), when steady GDP growth was coupled with a rising female labour force participation rate, which was spurred both by the growth of sectors in which women made up the majority of workers and by the feminization of some sectors where fewer women had been employed in the past. This is also in keeping with the convergence of male and female participation rates seen between 2003 and 2007, when the recovery was at its strongest. The converging trend of employment rates during boom periods is also in keeping with the diverging trends in unemployment rates (Novick and Rojo, 2009).

In Peru, feminization raised GDP growth by 4.7%. The strong significance of this variable may be attributable to events during the latter years of the period, when the feminization rate climbed steeply during the upswing in growth that began in mid-2007. However this happened when women's average wage was dropping, as was the male labour force participation rate. It can thus be inferred that, since growth was occurring while mean wages were declining, the demand-side effect was less strong than the effect of the reduction in the cost of labour in a benefit-led economy.

While it is clear that the fact that women who had not been working before took up jobs in the labour market helped to raise national income in both Argentina and Peru, given the fact that wage gaps are much wider in Peru, there may be different explanations for this positive effect in these two countries.

This means that, although women's participation in the labour force contributes to growth (see figure 5), it is not always beneficial for the women concerned, since the economic recovery may not be a consequence of that participation. This may have implications in terms of a reduction in the wages offered to prospective workers, which has also been seen in sectors subject to rapid feminization. In the last few quarters of the period under study, there was a turnaround in this trend, however, and the recession was coupled with increasing feminization, since male unemployment was on the rise. In other words, as has been observed in all the countries analysed in this study, feminization has occurred as a consequence of an economic slowdown.



Source: Prepared by the author.

^a Complete model for all the countries in the study.

Yet, given the positive impact of the lagged feminization variable, with a 19% jump in GDP growth for every percentage point rise in the rate of feminization, this phenomenon can be seen to have contributed to subsequent economic recoveries.

The data indicate that, especially in Ecuador, another variable of interest is the growth of the labour supply as measured in hours, which correlates negatively with economic growth. The increase in the number of hours per week is associated with an 8% drop in GDP. On the one hand, the presence of more women (as represented by their participation rate) relative to men has a positive effect on growth, but, on the other, an increase in labour intensity (more hours spent working in the labour market), which can be assumed to reduce the hours devoted to domestic labour, is not. This may also indicate that a gain in productivity (or a greater amount of effort devoted to work, in line with our earlier discussion of the lack of a counterbalance for the labour-income elasticity of supply) may correlate with a reduction in the number of hours of labour supply but may boost production and growth. By the same token, this may be reflecting an “extra-market” effect; in other words, if the feminization rate had been falling during preceding periods (demonstrating that women had been able to leave the labour market and devote themselves to working in the home as a consequence of an earlier recession, for example), the upswing in the growth rate could be spurred by the household “savings” realized by families in that situation.¹³ The fact that an increase in the female labour supply or in women’s labour intensity is associated with a reduction in GDP may imply that the contribution made by unpaid domestic work to an economic recovery outweighs the contribution made by an increase in hours worked at a low wage (which is biased in this case). This may mean that the gender bias in the labour market is greater than the male/female wage gap that is based on observable characteristic (education or experience, for example) and that the wages of women entering the workforce, on average, should be higher than the wage that the market is currently paying.

The incorporation of other controls into the model does not change the significance of the variables of interest, but it does provide a better explanation for the growth rate. Among factors relating to worker skill levels, the mean level of educational attainment of the EAP correlates positively, although fairly weakly (about 1%), with the growth rate for all the specifications. The level of significance remains the same, but is greater for the lagged variable, exhibiting positive effects in the medium term. In line with this result, the educational attainment gap (the ratio between the educational attainment of the male and female EAP) displays significant negative coefficients for the lagged variable (22%), while the contemporaneous variable is not significant. According to the existing literature on returns to education for men and women in the region, the relationship between educational attainment and wage levels is stronger for women than it is for men. Thus the elimination of these gaps could lead to higher wages and greater participation on the part of women, which could in turn have an impact on demand-led growth in the future.

Along these same lines, an interesting result derived from these models, and one which is corroborated by the data, is that there is a positive correlation between average wage increases and GDP growth, with a 1 percentage point increase in mean wages translating into a 3% upturn in GDP growth.

As for the macrovariables, the level of industrialization is negatively correlated (at nearly 7%) with GDP growth. This may reflect the fact that manufacturing sectors have been sluggish in recent years as the South American countries turn back to the production of commodities (known as “reprimarization”) and the diversification of their production sectors goes into reverse; growth has been driven by other sectors, and production activities have moved forward despite the relative decline,

¹³ Data on the number of hours devoted to housework are not available for all the countries in time series that can be used for macroeconomic analyses, but the above conclusion may be backed up by data for the particular case of Ecuador. Since 2003, employment surveys in that country have included a battery of questions on time use. The information gathered in these surveys indicates that the growth rates of the female labour supply are inversely related to the growth rates for the number of hours devoted to domestic labour, on average. The latter also exhibit patterns similar to those observed for economic growth.

on average, of manufacturing output during the period under study. Economic openness, on the other hand, correlates positively with growth in the case of the lagged variable (1.8%), reflecting these economies' export orientation.

Finally, the two country-specific variables also help to account for the rate of GDP growth. The external crisis variable used for the first two quarters of 2003 in Argentina and Uruguay and from the second quarter of 2009 onward for all the countries had a negative effect equivalent to about 3% on GDP growth. The variable for changes in government during 2003-2010 correlates with increased growth at a significant level, although the coefficient is fairly low (around 1%).¹⁴

Based on the conceptual framework used in this study, the hypothesis of a positive relationship between feminization and growth indicates that the feminization of the labour force is associated with greater income-generating opportunities for women and with positive effects on aggregate demand, investment and growth. However, assuming that a pay gap exists whereby women earn lower wages, a second hypothesis is that the entry of women into the workforce lowers average wages and, hence, production costs. This implies that feminization contributes to growth but that this positive effect may be heightened by the existence of gender inequalities that may then remain in place because of the savings that they afford. The above result could be a combination of the effects of these two factors, but the findings discussed above indicate that, during the period under study, the former effect outweighed the latter except in the case of Brazil.

V. Conclusions

These findings provide a basis for a number of basic conclusions. The negative selection effects in the labour supply generated by the exclusion of some people from the labour market who could be participating in it but are not doing so (in this case, women) remained virtually unchanged during this period and, in fact, tended to increase. A more detailed examination of the data shows that these selection effects were stronger in relation to full-time, contractual employment positions, which tend to be more highly paid and are usually more stable, despite the high growth rates experienced by the countries starting in the mid-2000s and continuing on into 2009. It would appear that these economies' growth modalities have promoted more labour-intensive activities rather than increased job creation, although, in some cases, (e.g. Brazil and Uruguay), average wages have not risen in step with the growth of the economy. In fact, the sectors where more employment opportunities for women have been opened up are service sectors, where the returns to wages are negative.

The labour supply estimates calculated for the countries included in this study point to the existence of three major trends. The first signals a decline in selection bias for both men and women in Ecuador and Peru and only in the case of women in Argentina and Uruguay. In fact, in Ecuador and Uruguay, the bias in the case of the male labour supply was close to zero as of the end of 2009. This overall decrease was coupled with some degree of convergence between the two groups except in Argentina.

The situation in Brazil was somewhat different, where the overall selection coefficients were on the rise owing to the very high theta coefficient registered from 2007 on, which contributed to lambda selection effect similar to what was seen in the other countries. This increase was much the same for men and women, with a converging trend being seen during the last year of the period under study.

The second trend traced an upward swing in the feminization of the labour market in all the countries and a reduction in the male labour supply in Argentina and Ecuador in 2009. In these last

¹⁴ During the period under study, a number of more progressive governments were established in Latin America. These governments placed greater emphasis on growth and on State intervention in the economy. For a discussion of some of the features of this period of economic recovery in the region and in the changes in course plotted by these governments, see Machinea and Hopenhayn (2005) and Lustig (2009).

two cases, the trend may have had something to do with the recent financial crisis, one of whose consequences was a shrinkage of the EAP in those two countries. The rise in feminization was, in most cases, coupled with reductions in labour intensity (number of hours per week), which indicates that underemployment continues to be the main option for women who wish to work.

The third observation was that female labour force participation followed the same trend as economic growth, but fluctuations were countercyclical, as was its rate of increase. A slowdown in the increase of this segment of the labour supply may therefore be signalling a substitution of activities in the home that help to support an economic recovery, although the increasing presence of women (relative to their non-entry) is a positive development that plays an important role in economic growth and in their personal situations.

Consequently, entry into the labour market, while on the rise, is no guarantee that a person will obtain employment, especially employment under suitable conditions. The persistence of unemployment is, generally speaking, attributable to a market's weak labour absorption capacity, while the presence of underemployment is associated with a limited level of productive job creation. Thus, shortcomings in the employment structure are manifested in persistently high unemployment rates and the continued existence of various forms of underemployment. These findings are in line with those presented in much of the empirical literature dealing with the employment status of women in Latin America, especially in recent years and during the 2008-2009 recession.

Clearly, women's entry into the labour market brings improvements in their personal and family situation and, according to the results of this study, in the overall economic situation as well. The feminization of the labour force associated with a narrowing of the gap between the male and female labour force participation rates generates growth in GDP as measured both by contemporary and by lagged values, and indications exist of a potentially positive effect over the medium term. However, an increase in the number of hours works (labour intensity) bears an inverse relationship to growth, which could be a sign of a negative impact of a reduction in the time devoted to care work unless the shortfall is made up for by the substitution of public or private caregiving services or by the assumption of some of these tasks by other members of the household. In order to verify this intuition, it would be necessary to undertake an analysis of how household labour and savings are influenced by changes in the female labour supply.

Another variable that acts as a strong incentive for economic growth is the (lagged) growth of mean wages. This is the underlying condition for the feasibility of demand-led growth, but it is also in keeping with the preceding conclusion, since, although low wages in the present may boost growth, wages will have to trend upward if that growth trend is to be sustained.

Therefore, both the negative selection and the pay gaps generated by horizontal inequality can have a positive impact on growth in the short run, with that impact being transmitted via two channels: a reduction in labour costs and household savings (if women devote more time to working in the home or hold less stable jobs).

If the economic policies and export orientation of many of the economies covered here place emphasis on short-term earnings, then pay gaps and gender-based discrimination may continue to buttress this growth modality. It is therefore necessary to devise policies that will bring about changes in the production structure and its orientation so that demand-led factors may open the way for a type of growth that is more solidly based on equity, with equity being a policy goal in its own right, rather than being seen as an "add-on".

As for the mesoeconomic aspects of the market and labour policy, this study offers a number of key subjects for consideration in the development of public policies designed to improve the labour force participation of women and its potential effects by helping to create a virtuous circle of feminization-expanding demand-growth.

The first of these subjects has to do with the organization of work (with “work” being defined as all points along the caregiving-market continuum) in such a way that the labour regime will meet the demands of both caregiving and the economic system. This will require breaking down major labour-market entry barriers so that social protection can be combined with labour and economic policies that will provide reliable, ongoing funding for integrated service systems. Labour policy should focus on ensuring that the employment regime incorporates the needs associated with the family life cycle and that employment regulations designed to afford social protection are applied equally to men and women so that women will not be seen as “expensive” workers by potential employers and so that the hours that women work in the labour market are matched by a positive impact on aggregate demand, productivity and growth.

A second subject deals with education, training and preparations for taking part in the workforce, with the types of information and networks regarding labour demand, wage levels and selection and recruitment processes that women can gain access to and the types of labour regulations and inspections needed to help reduce segregation and narrow pay gaps. Means of upholding the equality of men and women, non-discrimination, non-segregation and the co-responsibility of society for the provision of care should be more fully incorporated into regulatory frameworks and in government oversight procedures, as well as into the agendas of workers’ organizations.

Finally, from a methodological standpoint, this research raises some points concerning future analyses of the relationship between growth and gender inequality (and inequality in general) that merit further exploration. While the values transmitted by gender inequalities in the reproductive sphere cannot be measured using the information currently available, an analysis of the visible portions of the economy suffices to show that reproductive matters have an influence on the economic labour regime that this regime, in its turn, has an impact on the wider economy. This type of observation becomes possible when the labour supply is seen as the nexus between the mercantile economy and the household and as the result of a process of conflict between the two that also generates additions to the labour force. This has been the methodological approach used in this study. Better and more complete indicators of development (in addition to growth) and new measurements of gender inequality need to be included in the macro analysis of these phenomena, however. An exploration of other theoretical models that are better matches for the concept of an integrated economy is also called for. There is a need to reframe the endogenization of the labour supply in such a way as to reflect the fact that it is not simply a matter of a choice between different uses of time or between saving and consuming but rather that it entails complex processes that are shaped by social arrangements and conflicts systems as well as by the structure of the economy.

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Annex A1

Table A1.1
Fixed effects specification test: feminization

Specification 1	(b) FIXED_2	(B) RANDOM_2	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
investment~ib	-0.1686565	0.0573637	-0.2260203	0.0992541
L.investm~ib	0.0303124	-0.1473261	0.1776385	0.0886562
L2.invest~ib	0.0288376	-0.2557388	0.2845764	0.1338661
feminization	0.7887797	0.0185267	0.770253	0.4044201
L.feminiza~n	-0.3723222	-0.3534988	-0.0188234	
L2.feminiz~n	0.0647415	-0.1011472	0.1658887	0.0911338
education~a	-0.0059632	-0.0063436	0.0003804	0.0040306
fem_argent~a	-1.341968	-0.0225667	-1.319401	0.8209595
fem_brazil	-0.5604077	-0.1900654	-0.3703423	0.595131
fem_ecuador	-0.9882586	-0.129229	-0.8590296	0.4538183
fem_peru	-0.3081725	-0.0662077	-0.2419648	0.6024027
d_government	0.0023519	0.0104388	-0.008087	0.0043851

b = consistent under Ho and Ha; obtained from xtreg

B inconsistent Ha, efficient Ho; obtained from xtreg

Test: Ho difference in coefficients not systematic $\chi^2(12) = (b-B)'[(V_b-V_B)^{-1}](b-B) = 5,13$
Prob>chi2 = 0,9536

Specification 2	(b) FIXED_3	(B) RAMDOM_3	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
investment~ib	0.0947441	0.1097889	-0.0150449	0.1125835
L.investm~ib	0.0577002	0.0185697	0.0391305	0.1330804
L2.invest~ib	0.1269483	0.1319894	-0.0050411	0.110423
feminization	0.0666373	0.1137812	-0.0471439	0.102343
L.feminiza~n	-0.3334827	-0.3143287	-0.019154	0.114324
L2.feminiz~n	-0.0687099	0.2736242	-0.3423342	0.0847786
incr_hours_m	-0.0658539	-0.106271	0.0404172	0.0523413
L.incr_hou~m	-0.0926459	-0.1033992	0.0107533	0.0267719
incr_wages~4	0.0039381	0.0184609	-0.0145228	0.0045453
L.incr_wag~4	-0.0105544	-0.0102478	-0.0003066	0.0110023
L2.incr_wa~4	0.0325524	0.0144698	0.0180825	0.0047757
Openness	0.0059945	-0.0042663	0.0102608	0.0035646
L.openness	0.0356175	0.0091102	0.0265073	0.0065033
L2.openness	0.0508193	-0.007941	0.0587603	0.0252948
Manufacture	0.5873649	0.2079639	0.379401	0.2420066
L.manufact~a	-0.2910921	-0.1930398	-0.0980523	0.011293
L2.manufac~a	0.3245035	0.0669439	0.2575596	0.1690496
gap_edu~a	0.3946982	0.2321393	0.1625589	0.0861091
education~a	-0.025813	-0.0050629	-0.0207501	0.093747

b = consistent under Ho and Ha; obtained from xtreg

B inconsistent Ha, efficient Ho; obtained from xtreg

Test: Ho difference in coefficients no t systematic
 $\chi^2(20) = (b-B)'[(V_b-V_B)^{-1}](b-B) = 13,45$
Prob>chi2 = 0,2674

Specification 3	(b) FIXED_4	(B) RANDOM_4	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
investment~ib	-0.3105985	-0.0250665	-0.285532	0.1501545
L.investm~ib	0.4257956	0.1472383	0.2785573	0.1536835
L2.invest~ib	0.3680402	0.0935648	0.2744754	0.1559726
feminization	1.123705	0.2364684	0.8872363	0.550181
L.feminiza~n	-0.1357549	-0.1381812	0.0024263	0.0200397
L2.feminiz~n	0.0429889	-0.1774335	0.2204224	0.1225627
incr_wage~4	0.0042054	-0.0005276	0.0047329	0.0059859
L.incr_wag~4	-0.0096526	0.0064797	-0.0161323	0.0122084
L2.incr_wa~4	0.0282299	0.0286311	-0.0004012	0.0052577
Openness	0.0005758	0.0046368	-0.0040611	0.0040646
L.openness	0.0367211	0.0329127	0.0038084	0.0045161
L2.openness	0.0681435	0.052462	0.0156815	0.0125536
Manufacture	0.7853062	0.6188142	0.166492	0.2389519
L.manufact~a	-0.3755361	-0.3216545	-0.0538816	0.0835781
L2.manufac~a	0.4140829	0.2811619	0.132921	0.0803168
gap_edu~a	0.1563221	0.3115227	-0.1552006	0.1371424
education~a	-0.0194555	-0.0207719	0.0013165	0.0042069
fem_argent~a	-1.571086	-0.0072999	-1.563786	0.9585457
fem_brazil	-0.696639	-0.0361616	-0.6604774	0.9805168
fem_ecuador	-1.072292	-0.1328174	-0.9394745	0.5912154
fem_peru	-0.3028901	-0.0071759	-0.2957141	0.6760553
d_government	-0.0042728	0.0081865	-0.0124593	0.0065887
d_recession	-0.0342451	-0.0314171	-0.002828	0.0034887

b = consistent under H_0 and H_a ; obtained from xtreg

B inconsistent H_a , efficient H_0 ; obtained from xtreg

Test: H_0 difference in coefficients not systematic
 $\chi^2(23) = (b-B)'[(V_b-V_B)^{-1}](b-B) = 4.19$
 Prob> $\chi^2 = 0.96765$

Source: Prepared by the author.

Annex A2

Table A2.1
Endogeneity and reduced forms for verification of instruments
of variables of interest

Variable	Coefficient	F	Prob>F
FEM (Q-1)	0.631***	77.79	0.000
	0.071		
FEM (Q-1)	0.287***	46.09	0.001
	0.042		
Variable	Coefficient	F	Prob>F
Dif_FEM (Q-1)	0.796***	14.50	0.036
	0.038		
Dif_FEM (Q-1)	0.447***	11.34	0.025
	0.099		

Source: Prepared by the author.

Note: * significant at 90%; ** significant at 95%; *** significant at 99%.

Annex A3

Table A3.1
Results of panel models
Variable of interest: feminization of the labour supply

	Least squares (pooled data)			Autoregression panel correct for endogeneity of independent variables		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Dependent variable: GDP growth t/t-4						
GDP growth (Q-1), l(2)				0.607 ***	0.638 ***	0.607 ***
				0.076	0.071	0.099
GDP growth (Q-2)						
Investment/GDP	0.131 *	0.169 ***	0.186 **	0.092 ***	0.077	0.134
	0.067	0.051	0.078	0.028	0.112	0.091
Lagged investment (Q-1)				0.137 ***	0.121 ***	0.129 ***
				0.030	0.034	0.032
Lagged investment (Q-2)						
Feminization of the labour supply	0.040 **	0.047 **	0.031 *	0.057 **	0.055 **	0.059 **
	0.019	0.022	0.020	0.024	0.025	0.026
Feminization (Q-1)				0.073 *	0.079 **	0.077 **
				0.040	0.039	0.037
Feminization (Q-2)						
Human capital – EAP	0.006 *	0.005 **	0.007 ***	0.008 ***	0.009 *	0.008 *
	0.003	0.003	0.002	0.003	0.005	0.004
Human capital – EAP (L_Q-1)				0.008 ***	0.008 **	0.010 ***
				0.003	0.004	0.003
Human capital – EAP (Q-2)					0.003 ***	0.004 **
					0.001	0.002
Feminization_Argentina	0.015 ***	0.013 ***	0.010 ***		0.049 ***	0.047 ***
	0.001	0.002	0.002		0.016	0.013
Feminization_Brazil	0.099 ***	-0.088 ***	0.070 **		-0.013	-0.014
	0.032	0.030	0.031		0.016	0.028
Feminization_Ecuador	-0.057 **	-0.064 ***	-0.056 **		-0.004	-0.008
	0.024	0.020	0.022		0.008	0.013
Feminization_Peru	-0.029	-0.035 *	-0.031		0.021 *	0.024 *
	0.022	0.020	0.024		0.013	0.013
Increase in supply in hours		0.001			-0.063 **	-0.081 ***
		0.045			0.031	0.022
Incr_supply_(Q-1)					0.030	0.077 *
					0.050	0.042
Incr supply_(Q-2)						
Incr_average_wages					0.033 ***	0.027 ***
					0.009	0.011
Incr_average_wages (Q-1)		0.025 ***	0.021 ***		-0.017 ***	0.009
		0.009	0.008		0.005	0.016
Incr_average_wages (Q-2)						
Education gap		-0.172	-0.151 *		0.325	0.281
		0.747	0.096		0.322	0.218
Education gap (L_Q-1)					-0.226 *	-0.254 *
					0.130	0.146

Table A3.1 (concluded)

	Least squares (pooled data)			Autoregression panel correct for endogeneity of independent variables		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Economic openness		0.004 **	0.005	-0.003 **	0.003	
		0.002	0.176	0.001	0.002	
Openness (Q-1)				0.018 ***	0.018 ***	
				0.005	0.004	
Openness (Q-2)				-0.020 ***	-0.007	
				0.004	0.011	
Industrialization		-0.065 **	-0.084	-0.233 ***	-0.197 ***	
		0.030	0.285	0.060	0.074	
Industrialization (Q-1)				-0.048	-0.130 **	
				0.061	0.052	
Industrialization (Q-2)				0.119 ***	0.118 ***	
				0.032	0.027	
Change of government	0.007 *	0.007	0.009 *			0.009 *
	0.004	0.018	0.005			0.005
External crisis			-0.042 ***			-0.031 ***
			0.007			0.012

Source: Prepared by the author.

Note: * significant at 90%; ** significant at 95%; *** significant at 99%.