

# Female Labour Force Participation in a Era of Technological and Organizational Change

**October 2003**

**Abstract**

This paper examines the endogenous interaction between the rise in female labour force participation and changes in both the method and mode of production that occurred during the early part of the 20th century. Within a dynamic general equilibrium framework, an exogenous expansion in the skill level of the population induces an organizational change at the firm level and a redirection of investment towards new technologies that complement the skills of an emerging workforce. As such, an increase in the potential supply of skilled workers leads to an increase in the demand for skilled, female, workers and an overall increase in female labour force participation. In addition to allowing for a change in the mode of production in a market with directed technical change, this model establishes a framework in which to explicitly examine the transitional dynamics as the supply of skilled workers becomes relatively abundant. Whereas earlier theories fail to explain the movement in women's wages in this period; both the increase in women's wages and the decline in clerical wages relative to manufacturing can be explained by this model.

# Enabling the Visible Hand: Organizational and Technological Innovation and the Supply of Skilled Workers

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## **Abstract**

In this paper, the relationship between the adoption of a new organizational structure, associated with the movement towards more concentrated industries, and the movement of women into clerical positions is investigated. Input demand equations derived from generalized Leontief cost functions are estimated using industry specific data from a sample of Ohio manufacturing industries in 1933, 1935 and 1937. By disaggregating the data by both gender and type of employment (production or administration), I find that female clerical workers were substitutes for the physical capital employed by Ohio manufacturers and that technology adoptions saved on the employment of capital, male labour, and female production labour, and increased their use of female clerical labour. This evidence suggests that technological change in the U.S. during the early 20th century may have been biased in favour of female clerical labour. In order to test the hypothesis that firms reorganized in order to take advantage of the increase in skilled workers, I divide the sample into three groups of industries, identified by their degree of vertical integration, and find that industries that were fully integrated took advantage of the availability of skilled female workers in the way characterized by the change in organizational structure described in my model. The preliminary results presented in this paper are consistent with the view that U.S. manufactures responded to the increase in educated female labour in a way in which simultaneously expanded the demand for those workers.

# Calibration Results for a Generalized Model of Female Labour Force Participation in an Era of Organizational and Technological Change

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**Abstract**

The extent to which growth in human capital, accompanied by a change in the organizational structure of the firm and the adoption of new technologies in the sector that employed women, can account for an early transition of women into the workforce, is evaluated. The basic model from Adshade (2003) is generalized to include imperfect obsolescence of technology, sector-dependent returns to specialization parameters and productivity differentials between organizational modes. Using parameter estimates and changes in wages and employment over the period 1880 to 1970, the simulated results of the model are matched to changes in the relative wage of female clerical workers to male production workers, relative wage bill payments to workers in administration, the share of output produced by industries using the new organizational structure and the average annual growth rate of GDP. The basic model predicts the direction of change in employment and wages well but under predicts both the level of relative wages. The generalized version improves the models ability to match the rate of adoption of the new mode of organization but at the expense of matching wage levels.