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What Explains the U-Shape Form of Women's Labor Force Participation Rate?

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A well-established fact pertaining to women's labor supply is a U-shaped relationship between women's labor force participation and the level of development (as measured by income per capita), with participation being the highest in the poorest and richest countries.[1]

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1. An early study documenting this U-shape pattern is Mammen and Paxson (2000). More recent studies include Tam (2011) and World Bank.

Figure 1 illustrates well this relationship.

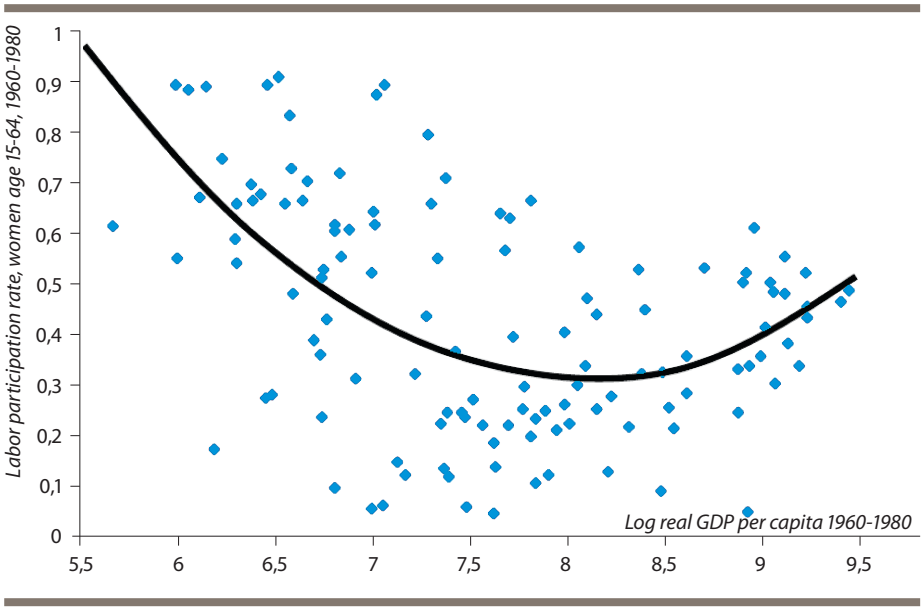

Figure 1. Women's Labor Supply and Economic Development

This note reviews standard explanations for this pattern and discusses whether an alternative channel, based on the link between women's access to infrastructure and labor supply may not be an equally plausible explanation.

Standard Explanations

Various explanations have been offered for the existence of the U-shaped relationship depicted in Figure 1. A first explanation related to changes in access to technology and the availability of unearned incomes (be it income generated by her husband if she is married, or income from other family members). For very poor countries, female labor force participation is high, and women work mainly in labor-intensive farm or non-farm family enterprises—possibly with less access than men to inputs relevant to farming activities and other productive assets such as labor-saving technologies. Women enter the labor force even at fairly low wages because unearned incomes are also low. Development initially moves women out of the labor force, partly because of the rise in men's wages and earnings (which therefore raise unearned income) and partly because of social barriers against women entering the paid labor force. However, as countries continue to develop, women's education levels rise, and women move back into the labor force as paid employees. Thus, at low levels of income, they work more than they would like. As income increases, female labor force participation decreases. Eventually, capital per capita is high enough to induce women to join the labor force again. As income rises, women move from work in family enterprises to work as paid employees.[1]

A second explanation is based on changes, in the course of development of substitution and income effects associated with changes in wages. A woman's decision to enter the labor market depends in general on two key components. The first is the opportunity cost of her time; a higher wage induces a substitution effect that makes working away from home, and working for a longer period of time, more attractive. As long as this substitution effect dominates the

1. This pattern also has implications for the behavior of fertility over the course of development.

offsetting income effect, higher wages (which tend to promote investment in human capital and the acquisition of market-related transferable skills) would tend to increase female labor participation, as suggested by the empirical evidence. The second is income that is not earned directly, as referred to earlier. This exerts only income effects, therefore depressing female labor participation rates. Thus, the U-shaped pattern alluded to earlier could result from the fact that, at low and high levels of economic development, unearned income is low. Alternatively, the (negative) income effect may dominate the (positive) substitution effect initially, with a reversal at higher levels of development. Indeed, as income increases initially, and with female educational levels relatively low, the demand for children may also increase, causing female participation rates to decrease due to a negative income effect. Over time, as income continues to increase, and with opportunities for women to invest in education and engage in paid work improving, there may be a substitution of "quality for quantity" in the desired number of children, leading to a stronger substitution effect.

A third explanation is that the U-shaped relationship depicted in Figure 1 is the result of cultural, religious, and social norms, which restrict employment opportunities for women. Indeed, at low levels of income women (who often do not hold any land) may have no choice but to engage in family farm activities or agriculture more generally. If the structure of production changes over time, with a shift first from agriculture to male-labor intensive manufacturing (associated with the expansion of markets and the creation of new technologies), and subsequently a change in the composition of manufacturing toward female-labor intensive industries (such as textiles or light electronics), coupled with a shift toward services and improved opportunities for women to educate themselves), a U-shaped relationship may emerge.

The fact that cultural and religious factors may be important in determining women's labor force participation rate is well illustrated by comparing rates for the Middle East and North Africa with other developing regions (see Table 1).

An Alternative Explanation?

Another possible explanation for the excistence of a U-shaped relationship between women's labor force participation rate and economic development is that it may result from a nonlinear relationship between time allocated to market work and access to infrastructure. In the early stages of economic development, public capital is typically insufficient, constraining private activities and opportunities for market work for both men and women (see Agénor (2012) and Agénor and Canuto (2012)). For instance, the lack of roads may prevent farmers from investing in transportation equipment. In addition, women must allocate a large fraction of their time to home production. Thus, time devoted to market work is limited and women participate mostly in family farm activities. As access to public capital improves, and (complementary) private capital expands—possibly as a result of a switch to more efficient production techniques, because public capital raises the rate of return on physical capital—labor productivity and thus labor demand increase, while time allocated to farm activities and home production falls.

But initially women may allocate most of the resulting time savings to their children's health and their own health care (as shown in Agénor and Agénor (2009), and Agénor et al. (2009)) or possibly also to the acquisition of skills. The former effect would occur if, initially, the preference for children's health is very high. As a result, the effective female labor force participation rate (including both farm and off-farm activities) may fall. Over time, as access to public capital continues to improve, women may choose to allocate more of their time savings to market work if their preferences toward children

Table 1. Labor Force Participation Rates by Sex, World and Regions, 2000-2011 (in percent)

Males	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011*
World	78.6	78.4	78.2	78.0	78.0	78.0	77.8	77.6	77.5	77.3	77.1	77.1
Developed Economies and European Union	70.2	69.8	69.4	69.1	69.0	69.0	69.1	69.1	69.0	68.4	68.0	67.9
Central and South-Eastern Europe (non-EU) and CIS	69.4	68.6	68.1	67.5	67.8	68.2	68.3	68.9	69.5	69.7	70.0	70.3
East Asia	82.1	81.7	81.5	81.2	80.9	80.7	80.5	80.3	80.0	79.8	79.6	79.6
South-East Asia and the Pacific	82.8	83.1	82.8	83.1	83.2	82.7	82.4	82.1	81.9	81.8	81.9	81.8
South Asia	83.3	83.3	83.3	83.3	83.3	83.4	83.1	82.6	82.2	81.7	81.4	81.3
Latin America and the Caribbean	80.7	80.5	80.3	80.0	80.2	80.2	80.1	79.9	80.0	79.7	79.8	79.7
Middle East	74.0	73.8	73.7	73.8	73.8	74.0	73.6	73.5	72.8	73.1	73.6	74.0
North Africa	74.9	74.2	74.1	74.5	75.0	75.2	74.1	74.1	74.1	74.1	74.1	74.1
Sub-Saharan Africa	77.0	76.7	76.5	76.2	75.9	75.9	75.9	76.0	76.2	76.1	76.1	76.2
Females	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011***
World	52.0	52.0	52.1	52.1	52.2	52.4	52.2	52.0	51.7	51.4	51.2	51.1
Developed Economies and European Union	51.8	51.7	51.7	51.9	52.0	52.2	52.5	52.7	53.0	53.0	53.0	53.1
Central and South-Eastern Europe (non-EU) and CIS	49.4	49.0	49.4	48.6	48.3	48.5	48.8	49.1	49.2	49.6	49.7	49.9
East Asia	69.7	69.4	69.1	68.7	68.3	68.0	67.8	67.7	67.2	67.0	66.9	66.7
South-East Asia and the Pacific	58.5	58.8	58.4	58.4	58.4	58.5	58.3	58.5	58.7	58.5	58.6	58.7
South Asia	35.0	35.4	35.8	36.3	36.8	37.4	36.3	35.1	33.9	32.8	31.7	31.8
Latin America and the Caribbean	48.1	48.7	49.6	49.8	50.8	51.3	51.5	51.8	52.1	52.6	53.2	53.5
Middle East	16.3	16.7	17.2	17.8	18.4	19.0	18.7	18.5	17.7	17.8	18.1	18.4
North Africa	22.1	21.7	21.2	21.9	22.4	22.6	22.7	23.6	23.7	23.8	24.0	24.2
Sub-Saharan Africa	62.7	63.1	63.5	63.8	64.0	64.1	64.2	64.2	64.4	64.4	64.4	64.5

Source: ILO, Global Employment Trends (January 2012, p. 96).

diminish and their preference for current and future consumption of market goods increases.

Thus, despite the fact that the marginal productivity effect of public capital on labor diminishes over time, female labor force participation rates may increase again gradually. As a result, the overall female labor participation rate (again, including both farm and off-farm activities) may exhibit the U-shape pattern documented earlier—with participation in market work alone taking more the form of a J-shaped or simply monotonic curve, the latter possibly concave, rather than convex, in nature.

Testing this relationship may be difficult for a number of other reasons. First, at low levels of income, one constraint on women's time allocation is the lack of availability of child care. If so, even when access to infrastructure improves, it may not lead to increased participation rates due to social norms. Second, time allocated to market work is lumpy, rather than continuous. For instance, a woman may not be able to work an extra 30 minutes a week because of improved access to water. Thus, unless there is a very large reduction in time allocated to household chores, women may well allocate the time savings to activities other than market work. In other words, there is a nonlinearity (or discon-

• • • /• • • tinuity) associated with time savings, which could be difficult to detect in the data. At the same time, however, even though there is a discontinuity at the individual level, it may not persist at the aggregate level.

A preliminary study by Baah (2011) provides some encouraging results for this alternative explanation. Using cross-section data for a large group of developed and developing countries, she tested whether the U-shape relationship illustrated in Figure 1 exists with respect to access to infrastructure. Her results suggest that the hypothesized U-shape relationship does indeed exist with respect to energy and transport (proxied in the first case by kwh per capita, and in the second the density of the road networks, itself measured in terms of km per capita), with each variable having an independent effect on women's labor participation rates, above and beyond the effect of these variables on the level of economic development. Further studies along these lines, based perhaps on more comprehensive panel datasets, would be useful to better understand the relationship between women's labor supply, infrastructure, and the process of economic development.

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