Globalisation, Gender and Growth

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Abstract

We consider the effect of globalisation on fertility, human capital and growth. In our view, globalisation produces market opportunities for employment in less developed countries. We develop a model of household decision making and show that if the market opportunities produced by globalisation are for women then globalisation reduces fertility and increases human capital formation. If the opportunities are for men then fertility increases and human capital formation falls. We then show that globalisation that produces job opportunities for women increases growth.
1 Introduction

Globalisation is a term that is often used broadly and rather imprecisely. In this paper, we use it narrowly to describe the process by which capital flows to developing countries in order to set up factories that take advantage of low cost labour to produce goods that are then exported to developed countries. Opponents of globalisation often refer to these as "sweatshops" and regard them as uniformly bad.

The word "gender" occurs in the title because we want to distinguish between factories that use predominantly female labor and those that use predominantly male labor. We make this distinction because we believe that which gender is employed in the sweatshops makes an important difference to its implications for economic growth and development. This in turn rests on a view of the household that models intra-household conflicts of interest. This view of households is becoming increasingly prevalent in economics, though it has by no means yet become the dominant paradigm.

We model the household as consisting of two individuals, one male, indexed \( m \), the other female, indexed \( f \). They have their own individual preferences that differ in important ways. Specifically, their utility may depend in general on their individual consumption, a household public good that we call the number of children or fertility,\(^1\) and a household public good that we call the quality of children or human capital.\(^2\) We use empirical work in the development literature to guide our formulation of preferences. Accordingly, we assume that the male in the household has a stronger relative preference for consumption and a larger number of children than the female, while she puts more weight on child quality.

Pre-globalisation, \( m \) devotes all his time to working on the family farm, producing a good which is sold at a fixed world price. The female, \( f \), divides her time between working on the farm and child care. We assume that \( m \) has higher farm productivity than \( f \). They allocate their household resources over the consumption good and the household public goods by some decision process which could, but need not, take the form of bargaining. The only assumption we need about this process is that it results in a Pareto efficient allocation.\(^3\) The distributional outcome of the process is however assumed to be sensitive to the value of the outside options\(^4\) that the individuals have. We will make this more precise in the next section.

The basic story is very simple. Pre-globalisation, because of his higher productivity on the farm, \( m \) has more bargaining power within the household and

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\(^1\)Throughout we will ignore integer problems and treat the number of children as a real number.

\(^2\)We measure child quality with a real number.

\(^3\)Standard bargaining models, such as the Nash bargaining model (for applications in a household context see Manser and Brown (), McElroy and Horney (), Ott (), and Gugl ()) or the "special interests" bargaining model of Pollak and Lundberg () of course have this property. For early generalisations of these models which focus just on Pareto efficiency, see Apps and Rees (1988) and Chiappori (1988).

\(^4\)If we were restricting attention to Nash bargaining models we would label these "threat points".
therefore his preferences play the major role in determining the household allocation. This will be a (relatively speaking) high consumption, high fertility, low child quality equilibrium. Consider now, the impact of globalisation. If this takes the form of investment that provides female jobs, then the female’s bargaining power within the household increases due to the increase in value of her outside option. This in turn, moves the household allocation in the direction of her preferences, which means less consumption, fewer children, but higher child quality.

At this point we could draw upon the model of Galor and Weil (1996), who show how, in an overlapping generations growth model, declining fertility results in a higher capital labor ratio, faster economic growth and a steady state with higher per capita income and lower fertility. The present paper can be regarded as providing an alternative view of what drives this process: Female labour-oriented globalisation works through the household allocation process in such a way as to reduce fertility and increase human capital.

If on the other hand globalisation takes the form of investment that provides male jobs, then \( m \) will have increased bargaining power within the household. This results in increased consumption and fertility but lower child quality and human capital. In this case, the economy converges to a lower per capita income and higher fertility steady state equilibrium. Thus, we argue that the form that globalisation takes is crucial. If globalisation results in new jobs for females it will lead to higher levels of human capital and growth. We now go on to test the consistency of this story with a formal model.

## 2 The Household Model

### 2.1 Pre-Globalisation

To make the results as sharp as possible we assume quasi-linear utility functions of the form

\[
  u_f(x_f, n, q) = \varphi_f(x_f) + \phi_f(n) + q \\
  \varphi'_f(x_f) > 0; \phi'_f(n) < 0 \\
  u_m(x_m, n) = \phi_m(n) + x_m \\
  \phi'_m(n) > 0
\]

where \( x_f \) \( (x_m) \) is consumption by the female (male) member of the household, \( n \) is the number of children in the household and \( q \) is the quality of the children’s upbringing. These functions are chosen both to keep the model simple, and to express in a stark way the preference differences between the individuals in the household. If \( f \) were given an extra dollar of income and she could choose according only to her own preferences, she would use it to increase child quality, by buying better food, medication, schooling etc. This is captured by the quasi-linearity of the utility function, with her consumption \( x_f \) and fertility \( n \) having
zero income effects. In addition, for $f$, more consumption raises utility while more children lowers it. On the other hand, if $m$ receives extra income and he can choose how it is spent he spends it on consumption. He derives no utility from child quality (over and above a basic level that is implicit in the variable $n$), but does have increasing utility in the number of children of this given quality.

We assume that farm output $y$ is given by the concave and strictly increasing production function $h(t_f, t_m)$, where $t_i$ is the time $i = f, m$ spends in farm production. To reflect the fact that $m$ has higher marginal and total productivity in farm production we assume that

$$h_f(t_f, t_m^0) < h_m(t_f^0, t_m)$$

(5)

at all variable input levels $t_f = t_m \geq 0$ and fixed input levels $t_f^0 = t_m^0 > 0$.

We assume a very simple child rearing technology:

$$n = ac \quad a > 0$$

(6)

where $c$ is the time $f$ spends in child rearing.

Likewise, quality per child$^5$ is given by:

$$q = bz \quad b > 0$$

(7)

where $z$ is an amount of the market good. That child rearing requires only female time while quality requires only the market good is of course a strong simplification but a useful one, and is not unreasonable.

We assume that $m$ spends all his time endowment $T$ working on the farm, while $f$ divides her time between farm work and child care, and so has the time constraint

$$t_f + c \leq T$$

(8)

When the couple behave cooperatively, they pool their income from farm production, with $p$ the exogenous world price of farm output, to give the budget constraint

$$\sum_{i=f,m} x_i + n(x_0 + \beta q) \leq py$$

(9)

where $\beta \equiv 1/b$ and $x_0$ is a given basic consumption level per child.

We define the values of the outside options of the two household individuals by adopting the "separate spheres" approach of Lundberg and Pollak, though without embedding this in a formal bargaining game. Accordingly, we assume that the value of the outside option is determined by the non cooperative equilibrium. In the non cooperative equilibrium, $m$ chooses the number of children, provides for their basic consumption $x_0$, works on the farm and keeps all the resulting output, while $f$ looks after the children, and chooses child

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$^5$ All children are assumed identical except for gender, and there is exactly $n/2$ of each gender in a family. This ignores for simplicity the evidence that there are very often gender differences in resource allocation in developing countries.
quality, where the expenditure on the latter, as well as her own consumption, have to come out of the revenue from her work on the farm. Moreover, working non-cooperatively is less productive for each of them than working cooperatively. We still assume that \( m \) is individually more productive than \( f \). This is expressed formally by the conditions on the individual production functions \( g_i(.) \), which are again concave and strictly increasing

\[
y_i = g_i(t_i) \quad i = f, m
\]  

with

\[
h(t^0_f, t^0_m) > \sum_{i=f,m} g_i(t^0_i) \quad \text{all } (t^0_f, t^0_m) \gg 0
\]  

\[
g_m(t^0) > g'_f(t^0) \quad \text{all } t^0 \geq 0
\]

We find the noncooperative allocations by first solving for \( f \)'s stand alone optimum

\[
\max_{x_f,q} \varphi_f(x_f) + \phi_f(n^0) + q \quad \text{s.t. } n^0 \beta q + x_f \leq pg_f(T - \alpha n^0)
\]

where \( \alpha \equiv 1/a \) and \( n^0 \) is the number of children chosen by \( m \) and so for \( f \) is exogenously given\(^6\). This problem yields an optimum utility level that we write as \( v^0_f \).\(^7\)

The corresponding problem for \( m \) is

\[
\max_{x_m,n} \varphi_m(n) \quad \text{s.t. } nx_0 + x_m \leq pg_m(T)
\]

Thus he achieves the utility level

\[
v^0_m = pg_m(T) - n^0 x_0 + \phi_m(n^0)
\]

So, \( (v^0_f, v^0_m) \) represent the outside option values for \( f \) and \( m \), respectively.

By assumption, there are gains from cooperation due to the higher efficiency of joint production. The couple must choose how to allocate these gains. For example, in return for a greater number of children \( m \) may make an implicit payment to \( f \), in terms of consumption, that allows her to increase the quality of children as well as her own consumption. Thus, the members of the household could be implicitly trading consumption for fertility and child quality. The values of the outside options determine the implicit terms of this trade in equilibrium.

When the household behaves cooperatively, it chooses a Pareto efficient allocation in which each individual receives a utility value at least as large as

\(^6\)We assume that after using her time to look after these children \( f \) has at least enough time to work on the farm to supply her minimum subsistence needs. This could be imposed as an explicit constraint on \( m \)'s problem.

\(^7\)This is of course a function of \( p \), but since we hold this constant throughout we ignore it here.
the outside option. Thus, we formulate the problem as maximizing $m$’s utility subject to some arbitrary utility for $f$ and the budget constraints.

$$\max_{x_i, n, q} x_m + \phi_m(n)$$

$$\text{s.t. } \varphi_f(x_f) + \phi_f(n) + q \geq u_f^0 \geq v_f^0$$

$$\sum_{i=f, m} x_i + n(x_0 + \beta q) \leq ph(T - \alpha n, T)$$

We do not require that $f$ be held right down to her outside option value, but we do assume that any increase in this will increase the utility level $u_f^0$ that she receives under the household decision process.\(^8\) Carrying out the comparative statics on the solution to this problem\(^9\) leads to the results that $\partial n / \partial u_f^0 < 0$, $\partial q / \partial u_f^0 > 0$. Thus, an increase in the value of $f$’s outside option, in increasing the utility she gets at the household equilibrium, results in a fall in fertility and an increase in child quality. Thus far the model supports the intuitive story.

### 2.2 The Household Model with Globalisation

In this section we explore the impact that globalisation has on households by considering what globalisation does to the outside options of each member of the household. We begin by considering what happens when globalisation results in an outside labor market opportunity for $f$. Suppose that globalisation results in a job situation in which she can supply some given amount of labor time\(^10\) $l_f^0$ for a wage rate of $w_f$. This implies that her time constraint becomes

$$l_f + t_f + c \leq T$$

while $m$’s remains unchanged. Her non cooperative allocation now results from solving the problem\(^11\)

$$\max_{x_f, n, q} \varphi_f(x_f) + \phi_f(n) + q \text{ s.t. } n^0 \beta q + x_f \leq pg_f(T - l_f^0 - \alpha n^0) + w_f l_f^0$$

Denote her new outside option as $\hat{v}_f(w_f)$.

Note that in the new non cooperative optimum she will only choose to supply market labor if her utility is higher than in the previous non-cooperative optimum. Thus the value of her outside option necessarily rises in that case. Since $m$’s non cooperative problem is exactly as before, the value of his outside option is unchanged. Therefore we have that, as a result of the outside

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\(^8\)This will obviously be the case in standard bargaining models.

\(^9\)See the Appendix for the details.

\(^10\)To assume endogenous labor supply complicates the model without really adding anything of substance. There is a fixed working day in the factory.

\(^11\)where of course it must be assumed that $\alpha n^0 + l_f^0 \leq T$
market opportunity, the value of f’s outside option rises relative to m’s. Moreover, it is straightforward to show that, essentially because of the assumed form of the utility function

\[ \hat{v}_f(w_f) = \partial q / \partial w_f = l_f^0 > 0 \]  

(21)

An increasing wage in the non-cooperative equilibrium feeds directly into increasing child quality by raising the value of the female’s outside option.

The household’s resource allocation problem now becomes

\[ \max_{x, n, q} x_m + \phi_m(n) \]

s.t. \[ \varphi_f(x_f) + \phi_f(n) + q \geq \hat{u}_f \geq \hat{v}_f \]

\[ \sum_{i=f, m} x_i + n(x_0 + \beta q) \leq ph(T - l_f^0 - \alpha n, T) + w_f l_f^0 \]  

(24)

Carrying out the comparative statics on the solution to this problem\(^{12}\) with respect to a change in the wage \(w_f\) shows that, unambiguously, \(\partial n/\partial w_f < 0\), \(\partial q/\partial w_f > 0\). Increasing the female wage rate, by giving her more bargaining power in the household, results in the household having fewer children of higher quality.

The first of these results is perhaps not quite so obvious, because an increase in the female wage has an income effect on m’s demand for fertility. However, in this model the fact that f’s utility allocation improves at the optimum and that only child quality has an income effect for her leads to an increase in quality, and this raises the cost per child and therefore induces a fall in fertility demand. Moreover, as compared to the situation where she does not work on the outside market, she has a higher marginal value product of farm work, and so time spent in child rearing is more costly. Thus the substitution effect of increasing child costs outweighs the income effect of increasing household income, which in any case arises only for m.

So, we conclude that globalisation that results in female job opportunities results in fewer children of higher quality in the household.

3 The Aggregate Growth Model

From the household model we conclude that fertility is a decreasing function of the female wage and child quality or human capital an increasing function of the female wage rate paid on the post-globalisation labour market. This suggests that it should not be too difficult to put together an aggregate model that shows how the introduction of a labor market for women as a result of globalisation leads to a process of growing per capita income and a better steady state than that prevailing pre-globalisation. This we now do, in terms of a two-generation overlapping generations model.

\(^{12}\)Again the details, which are routine, are given in the Appendix.
Consider first the female labor market, recalling that individual labor supply is fixed at $l^0_f$. Let $H_t$ be the number of two-person households at time $t$ and let $n_t$ be interpreted as the number of pairs of children each household has at time $t$, where it is assumed that one of each pair is male, the other female. Then we have

$$H_t = n_{t-1}H_{t-1} \quad t = 1, \ldots, \infty$$

with $t = 0$ the first period. The number of female workers at time $t$ is $H_t$, and so total labour supply at $t$ is

$$L_t = H_t l^0_f$$

Let $q_t = q(w_t-1)$ be the quality of a female worker at $t$, where this depends on the choice of quality made by the household at $t-1$, when the worker was a child. We have just seen that $q(\cdot) > 0$. For simplicity, assume that capital $K$, does not depreciate, and the production function is a standard linear homogeneous function

$$Y_t = S(q_tL_t, K_t)$$

with labour given in efficiency units. There is a given constant rate of return $r$, and a price of the output (in domestic currency) $e$, so that total wages are

$$W_t = eS(q_tL_t, K_t) - rK_t$$

and the wage rate is

$$w_t = W_t / L_t = es(q_t, k_t) - rk_t$$

with $k_t$ the capital/labor ratio. Then, since $n_t$ is a decreasing function of $w_t$ we can write $k_t = k(w_{t-1})$ with $k'(\cdot) > 0$. Thus, we have

$$\frac{dw_t}{dw_{t-1}} = es_lq' + (es_k - r)k'$$

But the profit maximisation condition that the marginal value product of capital equal the rate of return implies that the second term drops out. Thus the wage rate increases over time. Moreover, $w_1 > w_0$. Thus there is a unique steady state in this market if

$$\frac{d^2w_t}{dw_{t-1}^2} = es_lq'' + esq'sll < 0$$

that is, if $w_t$ is a strictly concave function of $w_{t-1}$.

Turning to the farm sector, per household output at $t$ is given by

$$h_t = h(T - t^0_f - \alpha n_t, T)$$

where it is assumed that improving child quality does not effect farm productivity (it would be easy to change this assumption). Then since $n_t$ is decreasing in $w_t$, we must have that per household output is increasing in $w_t$, and specifically

$$\frac{dh_t}{dw_t} = -h_f\alpha \frac{dn_t}{dw_t}$$
Declining fertility releases female labour time for farm work. Thus, we have that both per capita income from female market work and farm output per household increase until the market wage rate reaches its steady state.

4 Conclusions

We have developed a very simple model of how globalisation affects development. Our model focuses on how globalisation effects intra-household bargaining and what effects this has on economic variables. We find that globalisation that results in improved job opportunities for women leads to lower fertility and higher rates of human capital formation. If globalisation results in improved opportunities for men then the results are reversed. We embed these results in a very simple growth model and show that globalisation that favors women leads to higher growth rates.

5 References
