

From Stagnation to Sustained Growth: The Role of Female Empowerment[†]

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That cliometrics is an indispensable tool in the study of long-run economic growth is no longer a very controversial statement. At the theoretical level, it enables us to formulate problems precisely, to draw conclusions from postulates, and to gain insight into workings of complicated processes. At the applied level, it allows us to measure variables, to estimate parameters, and to organise the elaborate calculations involved in reaching empirical results. This article is an illustration of our belief in this principle. It explores the role of gender equality over long-run economic and demographic development paths of industrialized countries. We develop a unified cliometric growth model that captures the interplay between fertility, technology, and income per capita in the transition from stagnation to sustained growth. The theory suggests that female empowerment has been at the origin of the demographic transition and engaged the take-off to modern economic growth.

The Western world witnessed dramatic economic, demographic, and cultural upheavals during the past two centuries. This period marks a turning point in historical economic and demographic trends. Western countries experienced

similar patterns of economic and demographic transition, despite some variations in terms and timing and speed of changes (Galor 2012). Before the Industrial Revolution, all societies were characterized by a very long period of stagnation in per capita income with high fertility rates. Since this fateful period, Western countries observed a complete reversal with high sustained income per capita and low fertility. Figure 1 delivers a broad picture of France over the period 1000–2010. After a substantially flat evolution during centuries, per capita income displays sudden and brutal increases from the beginning of the nineteenth century, following what we call a “hockey stick” shape (Figure 1, panel A). In association with economic upheavals is the Demographic Transition. As illustrated by Figure 1, panel B, France experiences a drop in fertility rates, while life expectancy at birth increases significantly within a few generations from the second half of nineteenth century. At the same time, we note profound changes in the structure of the population. During the nineteenth century, formal education becomes accessible to a vast majority of the population. Illiteracy rates fall sharply, from 65 percent to 5 percent between 1720 and 1880 (Figure 1, panel C), and reach an average level close to zero at the turn of the twentieth century.

In parallel to economic and demographic evolutions, drastic changes occurred in gender relations. For a long time, the role of wife and husband within the household encompassed a sexual division of labor between home and professional sphere. The organization of the society evolved over time while gender equality improved. Figure 1, panel D displays the constant increase in the gender gap index¹ over the period 1837–1961.

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¹The gender gap index is a basic measure of the gender gap. It consists of the female-to-male enrollment rate in public primary school.

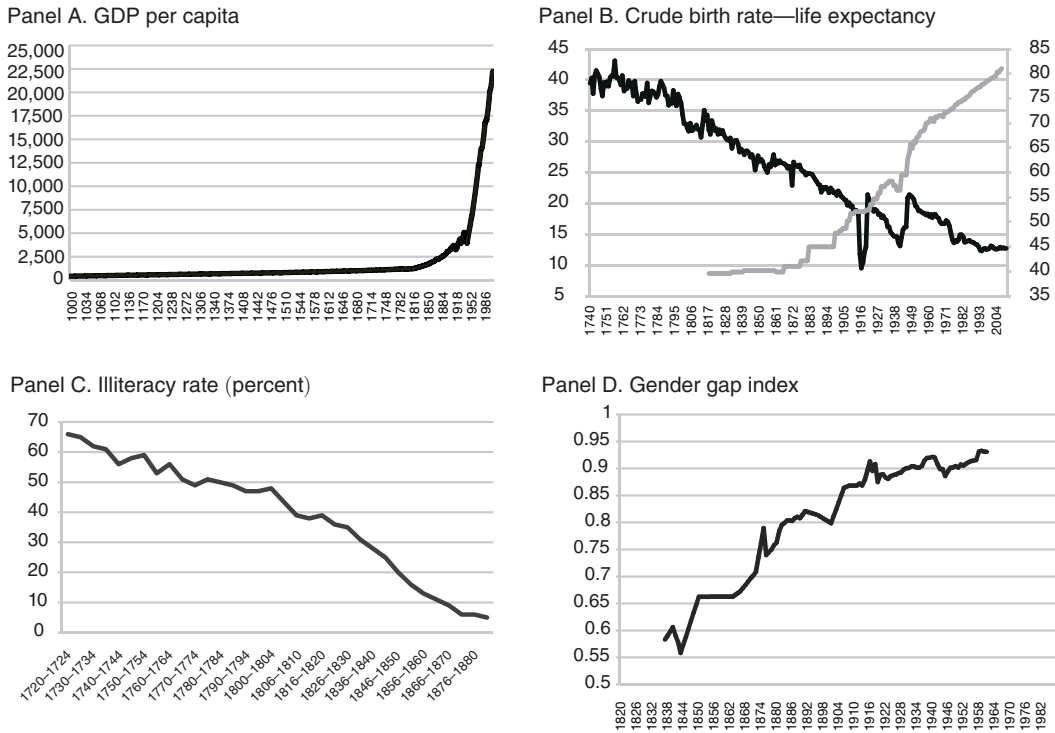


FIGURE 1. THE STYLIZED FACTS OF LONG-RUN DEVELOPMENT, FRANCE

Notes: The GDP per capita data in panel A (1990 International Geary-Khamis dollars) are taken from Madisson (2008). The crude birth rate (left axis) and life expectancy at age 0 (right axis) data in panel B are taken, respectively, from Chesnais (1992) and INSEE (2007). Crude birth rate indicates the number of live births occurring during the year, per 1,000. The illiteracy rate consists in the share of illiterates—people unable to read and to write (taken from Blum and Houdaille 1985). The gender gap index is the female-to-male enrollment rate in primary school, data taken from Diebolt. Missing intermediate values are obtained by linear interpretation.

Observed empirical evidence raises questions about the potential interaction between female empowerment, demographic transition, and economic development. What can explain the dramatic reversal of the relationship between output growth and population? What are the underlying behavioral forces behind the demographic transition? What are the endogenous interactions between education and fertility that result in the transition phase? Could female empowerment account for the observed take-off from stagnation to sustained growth in Western countries?

First advanced by Galor and Weil (2000)², the unified growth theory models the transition from

Malthusian stagnation to modern economic growth in a single framework. Galor and Weil emphasize the existence of three stages within the development process through the evolution of the relationship between the level of income per capita and the population growth rate. During the Malthusian Era (stagnation), population growth was positively affected by the level of income per capita. The absence of significant changes in the level of technology trapped the income per capita around a subsistence level and population size remained relatively stable. The Post-Malthusian Regime (take-off) is characterized by a significant increase in output growth, driven by technological progress, and by an unprecedented increase in population growth. Finally, the Modern Growth Regime shows a reversal of the relationship between income per capita and population growth which signaled the

² The seminal work of Galor and Weil was quickly followed by new contributions (for an overview see Diebolt and Perrin 2012).

transition toward a state of sustained economic growth. Common to most unified models is the rise in the rate of technological progress (through the emergence of new technologies) during the process of industrialization which increases the demand for human capital and induces parents to invest more in the education of their offspring. Investing in education increases the opportunity cost of having children and implies that parents will choose between number and education of children (the child quantity-quality trade-off³), which ultimately triggers economic and demographic transition.

Our paper contributes to this literature on unified growth theory by bringing to light new determinants of the long transition process. Our model incorporates novel and additional mechanisms consistent with observed stylized facts. The model emphasizes the importance of the role played by women in the development process. More precisely, we describe how a virtuous circle linking female empowerment, human capital accumulation, and endogenous technological progress could have triggered demographic and economic transition. The model encompasses the different phases of the process: a phase of stagnation, a take-off triggered by technological progress, and a phase of sustained economic growth accompanied by a demographic transition, driven by gender empowerment.

We emphasize the importance of mainstreaming gendered aspects in the comprehension of causes and implications of the development process. We strongly believe that improvements in gender equality have played a determinative role in the economic and demographic development of modern societies. We suggest that women's empowerment is a key engine of economic development, through its effects on demographic behavior and on human-capital formation of subsequent generations. Central to our article is the consideration that the development pattern characterizing Western society is deeply linked with the transformation of gender roles, driven by improvements in power imbalance between generations and sexes.

I. From Technological Change to Post-Malthusian Stagnation

In Diebolt and Perrin (2012), we develop a "two-sex" unified cliometric growth model which encompasses the observed long-run evolution of skill composition of the population, technology, fertility, and living standards. Our theory stresses the importance of human capital accumulation as engine of economic growth. Human capital is considered as a central factor of production. In addition, it enhances the productivity of individuals of current and future generations, through the acquisition of education, and reinforces gender empowerment.

The first part of the model is the positive effect of technological progress on skilled human capital through the increase in the rate of return to education. Individuals make their own decision regarding the quantity of education they wish to acquire, taking the economic and cultural environment into account. We differentiate two types of individuals: males and females. Each household comprises a man, a woman, and their children. Investing in skilled education is costly in terms of time. Such a cost induces individuals to face a trade-off between returns to education and the remaining available lifetime to enjoy those returns. The time worked at home is particularly important for women. Having and rearing children requires a specified amount of time.⁴ Women physically and socially bear costs of having children and invest disproportionately their time in childbearing.

As long as technological progress is not sufficiently advanced (early stages of development), the economy remains trapped in a Malthusian Era, where both output and population growth evolve proportionally around a subsistence level.

When the pace of technological progress accelerates, the positive relationship between the emergence of new technologies and human capital makes more profitable investments in skilled education. Nevertheless, as long as female bargaining power remains below a certain threshold, only men take advantage of returns to education. This initial improvement in

³ Becker (1960) was the first to introduce the distinction between child quantity and child quality.

⁴ The amount of time required for childbearing includes time for pregnancy, childbirth, recovery, feeding, and other needs of a child.

technological progress increases male incomes and eases households' budget constraint. This allows households to spend more resources on raising children and increases the number of children (the child quantity). This is the income effect. Such an effect could be a natural explanation of the take-off accounting for both higher levels of income per capita and population growth rates.

This patriarchal or male-breadwinner organization of the society implies a sexual division of labor between household members. Men work in the labor market, women at home. The so-called male-breadwinner model is characterized by a twofold purpose, that of maximizing both the income of the family and the number of children. That type of society is characterized by the low steady-state equilibrium in our model, i.e., by low gender equality, high fertility and a small fraction of population acquiring skilled human capital.

II. From Gender Empowerment to Sustained Economic Growth

Once technological progress is sufficiently high and gender equality reaches a specific threshold, returns to skilled human capital become high enough to allow girls to enjoy, in turn, returns to investments in education. Increased girls' education induces two complementary effects. On the one hand, it raises girls' endowment in human capital, which improves the female marital bargaining power within the household (gender equality at the aggregate level). On the other hand, the increased level of female human capital has a positive impact on offspring's endowment in human capital.

Ultimately, with a sufficient increase in returns to skilled human capital, women get higher bargaining power within households. This allows them to enter the labor market, which enhances households' budget. In return, acquiring skilled education is costly in terms of time. Thereby, the opportunity cost for women to have children increases as they invest in education. As a consequence, they have fewer children. This is the substitution effect.

Furthermore, having better educated women positively affects offspring. It improves health and life expectancy at birth, decreases infant mortality (increases number of surviving children), and gives rise to better educated

children. In turn, higher women's endowment in human capital generates higher children's endowment in human capital. This phenomenon engages the process of human capital accumulation. Empirically, this can account for the reversal in the relationship between output and population growth.

The trade-off faced by women between investment in education and fertility, i.e., career or family (Goldin 2006), is a key ingredient of the transition from Post-Malthusian stagnation to a Modern Growth regime. It implies that the optimal number of children is decreasing with the time invested by women in education. As gender empowerment increases, the amount of time invested by women in education rises, and fertility declines. Thereby, women's choices lead to a transition from quantity of children towards quality of children. Ultimately, such an effect triggers both a demographic transition and an economic transition.

This more egalitarian organization of the society implies a better repartition of duties between the household's members, in which both men and women work on the labor market. This is the dual-earnings model. Within such an organization of the society, i.e., the high steady-state equilibrium in our model, gender equality is high, fertility is low, and a relatively large fraction of population acquires skilled human capital.

III. Concluding Remarks

The evolution of the economy is characterized by demographic and economic transitions. The global dynamics of the economy are fully determined by the trajectory of gender equality, the stock of skilled individuals, and the rate of technological progress over generations. The economy is characterized by the three main following phases along with the development path: (i) A long phase of stagnation with low female bargaining power, few individuals acquiring skilled human capital, and large fertility rates; (ii) A rapid transition inducing a strong increase in gender equality, population acquiring skilled human capital, income per capita, and technological level; (iii) A phase of sustained growth in technology and income with high female bargaining power, almost all the population acquiring skilled human capital, and low fertility rates.

From generation to generation, the fraction of skilled individuals increases and generates a positive feedback loop, improving technological progress and the value of productivity. Ultimately, the economy experiences both a demographic and an economic transition driven by improvements in gender equality. One next step is to explain here why the demographic transition occurs first in France.

More generally our research agenda has the ambition to contribute to close the gap between theoretical growth models and economic history. This might open the door to a better economic theory, enabling economists to interpret current economic issues in the light of the past and to understand more deeply the historical working and path dependence of the socioeconomic processes (Diebolt 2012).

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