ELSEVIER
www.elsevier.com/locate/worlddev

World Development Vol. 45, pp. 337–351, 2013

0305-750X/$ - see front matter

http://dx.doi.org/10.1016/j.worlddev.2013.01.026

Demographic Transition in Resource Rich Countries: A Blessing or a Curse?

KJETIL BJORVATN
NHH Norwegian School of Economics, Bergen, Norway

and

MOHAMMAD REZA FARZANEGAN *
Philipps-University of Marburg, Germany

Summary. — This study argues that resource wealth is a key factor for understanding income effects of demographic transition. We develop a simple model highlighting how the income effect of increased labor supply may depend on resource rents, and provide empirical evidence that support the theoretical predictions. Using panel data covering the period from 1982 to 2006 for more than 120 countries, we find a negative interaction effect between resource wealth and demographic transition on national income. Moreover, the negative interaction effect does not depend on institutional quality, and is found also across different samples.

Key words — demographic transition, institutions, resource curse

1. INTRODUCTION

The Middle East and North Africa (MENA) is home to the most dramatic demographic transition in the world today, with its working-age population rising at a rate of almost 3% per year (Dhonte, Bhattacharya, & Yousef, 2000; Assaad & Roudi-Fahimi, 2007).[1] In other regions, similar demographic changes have constituted a powerful source of economic growth. In particular, Bloom and Williamson (1998) and Bloom, Canning, and Malaney (2000) have shown that one third of the rapid growth in the "Asian Tigers" in the 1970s and 1980s can be ascribed to demographic transition, partly explained by the direct effect of a larger share of workers in the population, and partly by the indirect effect of increased saving and investment.[2]

In contrast, the increasingly young populations in MENA appear to constitute a force of social and political unrest rather than economic progress. High unemployment rates and bleak prospects for a brighter future have contributed to bringing large numbers of young people to the streets, thus triggering the dramatic changes that are currently unfolding in the region.

One expression of the economic challenges facing the region is the low GDP growth rates. As shown in Table 1, the average per capita GDP growth rate for MENA in the time period 1976–2006 was only half of the world average, and far below that of the East Asian countries. The table also shows that the growth in working age population in MENA and East Asia in this time period was almost identical. For comparison, Latin America is included, with a somewhat higher per capita GDP growth and lower growth in working age population.

Why do some countries and regions seem to benefit more from demographic changes than others? Bloom, Canning, Fink, and Finlay (2007) focus on the quality of political institutions as a conditioning factor for the income effect of the demographic transition. The key finding in their study is that a demographic dividend can only be expected if institutions are sufficiently well developed.

Indeed, Table 1 shows that political institutions, like free and fair elections, are less developed in MENA than in East Asia. But the table also shows that economic institutions, like rule of law and control of corruption, are just as developed in MENA as they are in East Asia. When pointing to *institutions* as the key conditioning factor, it is therefore important to be clear about what kind of institutions one has in mind.

In the present paper, we highlight a different factor that can explain the different effect of the demographic transition in East Asia and MENA, namely *resource wealth*. As evidenced by Table 1, resource wealth in MENA, measured as a percent of GDP, is three times that of East Asia. Resource wealth has been found to affect the structure of the economy, a phenomenon known as the Dutch disease. It leads to the expansion of the non-traded sector at the expense of the traded sector. As argued by van Wijenbergen (1984), if the traded sector is more "dynamic" than the non-traded sector, this change in sectoral composition of the economy may have detrimental growth effects.[3]

Labor market data from the World Bank (World Bank, 2011) confirm the crowding out effect of resource rents in the labor market. In the period 1970–2006, an average of 46% of the total MENA labor force was employed in the services or non-tradable sector, while the corresponding number for East Asia was only 28%. As a sign of labor market inefficiency, the same data show that the total unemployment rate (as a percentage of the total labor force) in MENA was on average four times higher than that of East Asia (13% *versus* 3.6%).

Our paper adds to the traditional Dutch disease argument by showing that resource rents not only affect the structure

* We would like to thank the participants in the Brown Bag seminars at the TU Dresden and ZEW Mannheim, the Gulf Research Unit annual conference (2011) at the University of Oslo and the German Economic Association Conference (2012) at the University of Göttingen for helpful comments. Mohammad Reza Farzanegan acknowledges the Georg Forster Postdoctoral Grant of Alexander von Humboldt Foundation and the E.ON Ruhrgas financial support for this project (Nr. 211870).

Table 1. *Key indicators, selected regions*

Region	GDP per capita (percent growth)	Share of working age (percent growth)	Economic institutional quality	Democratic institutional quality	Resource rents (percent of GDP)
East Asia	6.70	0.71	0.51	0.45	7.79
MENA	0.79	0.69	0.51	0.15	24.34
Latin America	1.00	0.53	0.47	0.70	5.21
World	1.55	0.38	0.55	0.54	8.26

Source: World Bank (2011) and authors' calculations.
Note: OECD countries are excluded from the geographical regions of East Asia, MENA, and Latin America. GDP per capita growth rates are the average for the time period 1976–2006, while share of working age is the average yearly growth rate in the working age population (15–64 years) relative to the total population for the time period 1976–2006, both calculated using the geometric end point growth method. The institutional quality index is the unweighted average (1984–2005) of four indexes based on data from Political Risk Service: *Bureaucracy Quality, Rule of Law, a Control of Corruption and Investment Profile* (contract viability/expropriation, profits repatriation and payment delays). The index is rescaled from 0 to 1, where a higher value means better quality of institutions. The democratic institutional quality index is measured by the *Polity* index and rescaled from 0 to 1. Higher values show a higher quality of democratic institutions. Resource rents (as a percent of GDP, 1976–2006) are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents.

of the labor market and economic growth *per se*, but also reduce the capacity of the economy to productively absorb increases in the work force. We demonstrate that resource rents are an important conditioning factor for the growth effect of the demographic transition, even when controlling for institutions. In fact, the negative interaction between resource rents and the demographic transition variable holds both in a high-quality and low-quality institutional setting. This leads us to conclude that resource rents play an independent role in shaping the economy's ability to accommodate a large influx of young people to the work force in line with the Dutch disease argument rather than political economy mechanisms.

The remainder of the paper is structured as follows: Section 2 presents a simple theoretical model that demonstrates how resource rents may shape the impact of an increased work force on national income. Section 3 discusses our empirical strategy and the data. Section 4 presents the empirical evidence, while Section 5 provides a robustness analysis. Section 6 concludes the paper.

2. THE MODEL

The economy consists of a labor force l, which can be employed in two sectors; private sector manufacturing (l_M) and public sector bureaucracy (l_G). There is open entry and exit in manufacturing, with workers being paid the value of their marginal product. There are learning by doing externalities in manufacturing, for instance as ideas are shared between firms in the process labor turnover creating a common pool of industrial knowledge, implying that the marginal labor productivity in this sector increases with the total number of manufacturing workers. [4] In its simplest form, returns to scale in manufacturing gives rise to the following wage function:

$$w_M = l_M. \tag{1}$$

The government controls resource rents R. It is well documented that governments use public sector employment as a redistributive device, in many cases for "patronage" purposes to secure re-election (Alesina, Baqir, & Easterly, 1998; Auty, 2001; Robinson, Torvik, & Verdier, 2006). We assume that the government spends an exogenously given share ϕ of its resource revenues on public sector employment, and that it maximizes patronage benefits by employing as many public sector workers as possible. Government employment is thus given by:

$$l_G = \frac{\phi R}{w_G}. \tag{2}$$

Moreover, reflecting the patronage purposes of public employment, we assume that public sector jobs are entirely unproductive. In order to compete with the public sector in the labor market, manufacturing wages must match the wages offered in the public sector. The interior labor market equilibrium, characterized by $w_M = w_G$, can be expressed in terms of manufacturing employment as:

$$l_M^* = \frac{l + \sqrt{l^2 - 4\phi R}}{2}, \tag{3}$$

where $l_M^* = 0 \iff l = 2\sqrt{\phi \mathrm{R}} \equiv l^*(R)$. This also implies that for $l < l^*(R)$, no interior labor market equilibrium exists: In this case, $w_M < w_G$ for all l and there is no private manufacturing in the economy. In contrast, for $l \geqslant l^*(R)$, $w_M \geqslant w_G$ and there exists an equilibrium with an active manufacturing sector.

Observe that $l^*(R)$ is a positive function of R. Hence, the higher is R for any given l, the more likely it is that the economy does not have an active manufacturing sector. Income per worker is given by:

$$I = \frac{1}{l}(w_M l_M^* + R) = \frac{1}{l}((l_M^*)^2 + R), \tag{4}$$

where $l_M^* > 0$ requires that $l \geqslant l^*(R)$, otherwise $l_M^* = 0$. Using (3), we find that the effect of an increase in rents on income per worker depends on ϕ: If ϕ is high, say equal to one, then an increase in rents leads to higher per capita income, while if ϕ is low, say zero, then an increase in rents leads to higher income. Intuitively, the higher the share of rents spent on public sector employment, the more of the income gains due to the increase in rents is crowded out by a reduction in manufacturing employment, leading to lower productivity and wages in that sector. This effect can be seen as an expression of the "resource curse", and the mechanism is similar to the one modeled by Torvik (2002). On the other hand, given $l < l^*(R)$, so that the economy starts out without any manufacturing at all, the impact of an increase of R on income per worker is clearly positive, as income per worker in this case is simply given by the resource rent R/l.

Demographic transition is modeled as an increase in l. While clearly not capturing all aspects of this phenomenon (for instance, it does not incorporate an analysis of changes in dependency rates, which may affect savings and investment), it highlights a key ingredient, namely *the increase in the work force* as the "baby boom" generation (resulting from the reduction in infant mortality that typically triggers the demographic transition) enters the labor market. [5]

To illustrate the mechanisms of the model, consider two types of countries; a resource rich country A and a resource poor country B. To start out with, income per capita is the same in the two countries, but where the workers in country A derive their income entirely from public sector employment