Journal of Asian Economics 22 (2011) 48–60

Contents lists available at ScienceDirect

Journal of Asian Economics

Taxation, human capital formation, and long-run growth with private investment in education

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ARTICLE INFO

Article history:
Received 16 October 2009
Received in revised form 9 August 2010
Accepted 20 August 2010

JEL classification:
E62
H52
O10

Keywords:
Taxation
Government spending
Growth
Education
Indonesia

ABSTRACT

By extending a long-run endogenous growth model to include (i) both public and private investments in human capital formation and (ii) endogenous population growth, this paper examines the growth effects of Indonesian government policy that lowered the capital income tax rate in the mid-1980s. Quantitative analysis of the model finds that the introduction of these two features not only makes economic growth more sensitive to changes in capital income taxation than in models that omit these features, but also produces a relatively high growth rate as observed in the data. Moreover, results show that the growth effects of changes in public spending on education are stronger than those of taxation. This suggests that in the endogenous growth model, public policy aimed at enhancing human capital is more conducive to growth than a physical investment-encouraging tax reform.

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1. Introduction

During the 1970–1996 period, Indonesian economy experienced two distinct episodes of development. In the first episode, from 1970 to 1984, the country's fiscal policy was aggressive during which the government expenditure grew by almost 20% per year and its economy grew moderately with an average of 4.5% per year. During this period, taxes on income, profits, and capital gains were a major component of government revenue, contributing to around 75% of total tax revenues. The decline in oil prices and in the country's overall terms of trade in the mid-1980s, equivalent to a reduction of about 10% in Gross National Income, have forced the government to respond by cutting its expenditures and widening the reforms of the tax systems, starting in 1983. In the second episode, from 1985 to 1996, the average of annual government revenue grew by only 7.0%, while the economy grew relatively high with an average of 5.9% per year.[1] As the average tax rate was lowered from 30 to 25%, the contribution of taxes on income, profits, and capital gains to total tax revenues had decreased to 60%.[2]

Another contrast difference is the rapid human capital accumulation occurred in the 1985–1996 period. For instance, the average schooling years during the periods of 1970–1984 and 1985–1996 were 3.71 and 4.97, respectively, giving an

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[1] The data on growth rates, government revenues, and government expenditures are all taken from World Development Indicators (World Bank, 2009).

[2] Moreover, under the old system, there were 19 rates for individual income tax, ranging from 5 to 50%, and three rates for corporate income tax, 20, 30, and 45%, while the new income tax consisted of only three rates, 15, 25, and 35%, where all are applied to both individual incomes and corporate incomes. For an extensive review of the 1983 Indonesian tax reform and the subsequent years until 1999, from which the data on the tax rates are drawn, see Heij (2001). For contribution of taxes on income, profits, and capital gains to total tax revenues, see World Bank (2009).

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doi:10.1016/j.asieco.2010.08.003

increase of 34% (Barro & Lee, 2010). Moreover, the proportions of the male labor force with secondary and tertiary education have increased from 30 and 7 to 52 and 18%, respectively (World Bank, 2009).

This study asks: to what extent the fiscal policy implemented in the period 1985–1996 can explain the relatively high economic growth during the period?[3] To answer the question, we use the endogenous growth model with investment in human capital as the driving force of growth along the lines of Lucas (1990). Recent studies on the US economy using the models have shown that capital income taxation has a negligible effect on the US growth rate. For instance Stokey and Rebelo (1995) conclude that "Lucas's conclusion, that tax reform would have no effect on the US growth rate is theoretically robust, and consistent with the evidence (page 519)". One of the fundamental assumptions of the above model is that human capital is produced using existing human capital and learning time. Glomm and Ravikumar (1998) relax this assumption by introducing public spending on education in the production of human capital. Despite the distortionary government spending, their findings on the US economy are also consistent with that of Lucas's (1990) as tax reform negligibly affects human capital accumulation.

By taking into account some facts on the Indonesian economy, this paper introduces two channels in which tax reform could affect human capital formation and thus growth rate. The first channel is private investment on education. With its share of 60% of the total education spending during the 1970–1996, private spending played an important role in human capital formation in Indonesia (World Bank, 2009). The inclusion of this private cost of education into the standard model is non-trivial because in addition to facing the tradeoff between consumption and investment in physical capital, an individual is also faced with the tradeoff between consumption and investment in human capital in making decision about her income allocation. Consider when an individual must finance her own education. When her income decreases, we would expect her to spend less on her education.[4] For instance, Flug, Spilimbergo, and Wachtenheim (1998) find that changes in capital income tax rate has a stronger correlation with investment in human capital than physical capital suggesting that an increase in capital income tax rate will discourage not only investment in physical capital, but also human capital.[5] Hence, in a model where human capital is the driving force of growth, the growth effects of tax reform, theoretically, would be larger when privately financed investment is incorporated into the model.

The second channel is endogenous population growth. Unlike previous studies which usually assume zero or constant population growth rate, we take into account the relatively large decrease in the population growth in Indonesia from 2.16% in the 1970–1984 period to 1.6% in the 1985–1996 period (World Bank, 2009). Here, we endogenize population growth rate by linking it to time allocated on raising children, which then affects labor supply.[6] Consider when there is an increase in capital income tax rate. This will affect a household's decision whether to spend available time more on child-rearing, work, or learning. The lower after-tax rate of return will increase current consumption in favor of future consumption through the substitution effect, while the opposite direction runs through the income effect. If at the margin substitution effect dominates income effect, the individual will spend more on working, inducing either her child-rearing or learning time to decrease, which in turn raise growth rate.

To the best of our knowledge, no study yet examines the impacts of the 1983 tax reform on growth and other macroeconomic issues such as human capital accumulation. As such, this paper attempts to fill that void. In addition, by extending Lucas's (1990) and applying it to Indonesian economy, another major contribution of this paper is the investigation whether the well-established evidence of a negligible effect of tax reform on the US growth rate is also consistent with other economy.

Qualitatively, the introduction of these two features makes economic growth more sensitive to changes in capital income taxation than in models that omit these features. To draw its quantitative implication, we calibrate the model using the data from the 1970 to 1984 period and quantify the effects of changes in the capital income tax rate and public education spending on growth and human capital formation. Under plausible parameter values of the model, changes in capital income tax rate result in non-negligible effects on growth rate. For instance, eliminating the capital income tax rate can increase the growth rate by 0.9% points, higher than that of the model without private investment in education and with zero population growth.

Using the parameters of fiscal policy implemented in the period of 1985–1996 to examine its impact on growth and human capital formation, the model can produce a relatively high growth rate of 5.39%, which is close to the 5.55% rate

[3] We chose the year of 1996 as the end of the second period due to the fact that Indonesia experienced a major economic and financial crisis in 1997. Consequently, the series of deregulations introduced in the late 1980s and early 1990s may have little effect on the economy after 1996. Instead, the economy was likely more responsive to the policies enacted during and after the crisis.

[4] In a developing country such as Indonesia, where the majority of the population work in the agricultural sector, the above suggestion is most likely true. For instance, Cameron and Worswick (2001) find that the rural farmers in Indonesia tend to decrease their expenditures on education in response to crop losses.

[5] The study of the impact of earnings taxation on the formation of human capital was previously done by Boskin in the 1970s** who noted that the current tax structure creates a disincentive to accumulate human capital. A few studies thereafter, such as those of Eaton and Harvey (1980), King and Rebelo (1990), Trostel (1993), and Lord and Rangazas (1998), suggest the impact to be anywhere from negligible effects to a significant reduction in the long-run stock of human capital.

[6] Economic literature recognizes two effects of fertility (and thus population growth) on family labor supply. The first refers to the specialization effect which is derived from the fact that the responsibility of child-care tends to fall on women (Becker, 1985). The second refers to the home-intensity effect due to the fact that more children increases the value of parents' time as inputs in the production of a child good. In this case, both the mother and the husband will reduce their labor supply (Lundberg & Rose, 2000).

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