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ABSTRACT

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Economic theory predicts that military conscription is associated with static inefficiencies as well as with dynamic distortions of the accumulation of human and physical capital. Relative to an economy with an all-volunteer force, output levels and growth rates should be lower in countries that rely on a military draft to recruit their army personnel. For OECD countries, we show that military conscription indeed has a statistically significantly negative impact on economic performance.

JEL Classification: H20, H57, J22, C68

Keywords: growth, military draft, augmented Solow model

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1 Introduction

To recruit military manpower, governments can rely on conscription (military draft), on voluntary enlistments, or on a combination of both. Military manpower systems differ considerably across time and space. A number of countries (like the United Kingdom and the United States) rely on all-volunteer forces while other countries traditionally recruit substantial fractions of their military staff through conscription. Many nations have changed their recruitment systems over time, even during periods of peace.[1] Although proposals to (re-)establish a military draft surface from time to time even in traditionally nondrafting countries, the recent trend in military recruitment goes towards professional armed forces. A number of countries (encompassing Belgium, the Netherlands, France, Spain, Portugal, Italy, Hungary, Romania, the Czech Republic and South Africa) have abolished or started to phase out conscription. Still, 8 out of 22 countries that belonged to the OECD already in 1985 and had a population over one million are still running their armies with conscripts, with draft spells ranging from 4 to 17 months.[2] As a corollary to the military draft, most democratic countries offer conscientious objectors to bearing arms the option of an alternative service, typically to be delivered in the social sector.

Given its volume (the draft is generally intended to cover all able-bodied men in every cohort) and its duration (spells in the past typically were well above one and a half years), conscription can be expected to impact significantly on economic performance. Similarly, the economic costs of an all-volunteer force are significant as well. Both systems rely on the government's power to tax, either by forcing young men and, although rarely, women to work in the military or by levying monetary and general taxes the proceeds of which go to pay professional soldiers. Economists routinely argue that a military draft is the more costly way for a society to enlist military personnel. The extra costs of military conscription range from static deadweight losses to long-term distortions in the accumulation of human and physical capital (see the next section for a brief survey). Being of the same nature as military conscription, the use of conscientious objectors in the social sector causes similar efficiency losses.

Despite this clear verdict by economic theory, so far not much empirical evidence has been provided on the (macroeconomic) inferiority of a military draft, relative to an all-volunteer force. This paper establishes such evidence, at least for OECD countries in the period between 1960 and 2000. We empirically test — and confirm — the hypothesis that, compared with a professional army, military conscription exerts negative and lasting impacts on aggregate output and growth. We take as our starting point growth models by Mankiw et al. (1992)

[1] Australia, e.g., enforced military conscription during four periods in the 20th century: from 1911 to 1929, from 1939 to 1945, from 1951 to 1959 and from 1964 to 1972. Only the second period can be justified by the necessity to mobilize for a war.

[2] This criterion is used in the classic contribution by Mankiw et al. (1992).

and Nonneman and Vanhoudt (1996).

The rest of the paper is organized as follows: Section 2 briefly outlines the economic effects (which are mostly disadvantages) of military conscription. Section 3 reports empirical evidence from previous studies on the relationships between conscription, military expenditures, and economic performance. None of these studies has, however, explicitly focused on the macroeconomic and long-term impacts of military draft. Section 4 introduces such a set-up in form of an augmented Solow model. Section 5 reports our results, and Section 6 concludes.

2 Static and Dynamic Costs of the Draft

Already Adam Smith presented a clear case against conscription and found an "irresistible superiority which a well-regulated standing [=all-volunteer] army has over a militia [= conscription]" (Smith 1976 [1776], p. 701). Also later, most economists have been favoring professional soldiers over conscripted ones. They argue that, in spite of its lower budgetary cost for the government, a draft system imposes larger opportunity costs on society than an all-volunteer force. Most arguments in that discussion focus on static inefficiencies from which a draft system suffers (Hansen and Weisbrod, 1967; Fisher, 1969; Lee and McKenzie, 1992; Sandler and Hartley, 1995, Chapter 6; Warner and Asch, 2001):

- The military draft imposes opportunity costs on conscripts. They exceed the fiscal costs by the maximum amount draftees are willing to pay to avoid compulsory service and can be measured by the difference between potential market income and the lower pay during the service plus the pecuniary value of the disutility from having to work in an occupation and under circumstances that draftees otherwise would not have chosen.
- Largely ignoring the draftees' productivity differences and comparative advantages, conscription involves an inefficient match between people and jobs and, thus, an avoidable output loss.
- The apparent cheapness of draftee labor leads to an excessive personnel-capital ratio under conscription.
- Shorter periods of training, lack of experience, higher turnover rates and absence of motivation and incentives imply lower labor productivity for draftees than for professional soldiers.

There are a few exceptions on the widespread disapproval of military draft among economists: Lee and McKenzie (1992) and Warner and Asch (1995) developed models where a military draft system with its in-kind finance is socially less costly than a professional army whose high budgetary costs have to be financed through distortionary taxes.

Lau et al. (2004) argue that the draft involves, in addition to the static inefficiencies, dynamic and long-term costs that are absent from a professional army. These costs are due to the specific timing and incidence of the draft and emerge through two channels. First, the military draft hits young men and, although rarely, women during a period of their lives that they would otherwise devote to the accumulation of human capital: education, studying, vocational training, gathering first experiences on their job. The draft interrupts or postpones this investment process. Moreover, draftees see the human capital they accumulated before the draft depreciating during service. Both effects imply a reduction in the economy's stock of human capital (also see Spencer and Woroniak, 1969). Second, the draft as an in-kind tax is one-sidedly levied on young people. Compared to "normal" monetary taxation (which then could, among others, go to finance a professional army) the burden of the draft tax, measured in terms of the present value of the reduction of taxpayers' lifetime incomes, is higher. The front-loaded reduction in lifetime income discourages saving and, thus, capital accumulation, leaving the physical capital stock in an economy with a military draft smaller than in an otherwise identical economy with a professional army.

With a lower stock of human and physical capital, the level and the growth rate of national income in an economy tend to be lower than with an all-volunteer force. Simulations for a computational general equilibrium economy by Lau et al. (2004) demonstrate that these long-run costs of the draft are sizeable: If the whole population was subject to draft (i.e., everybody has to spend one year for military service at the age of 18), long-run GDP would be depressed by up to one percent, relative to an identical economy that has the same level of military output produced in an (equally efficient) all-volunteer army.

3 Empirical Studies

Virtually all empirical studies focus on the static efficiency losses of a draft system. These losses seem to be quite sizeable: Kerstens and Meyermans (1993) estimate that the social cost of the (now abolished) Belgian draft system amounted to twice the budgetary cost. Lutz (1996) reviews several studies and reports that the annual opportunity cost of conscription in the German army is between 2.2 and 6.7 billion euros.

There is a number of studies on the impact of serving in the military on the lifetime earnings of ex-soldiers. E.g., Imbens and van der Klaauw (1995) observe substantial losses of up to 5 percent of lifetime earnings (compared to non-conscripts) for Dutch draftees in the 1980s and early 1990s. Effects are even larger during times of war: in the early 1980s, the earnings of white Vietnam War veterans were 15 percent lower than the earnings of comparable non-veterans (cf. Angrist, 1990). For Germany, Kunze (2002) finds that compulsory service leads to increases in wage income for men by 3.2 percent during the first year after conscription and depresses wage income beyond the first year, where the gap in wages increases with time. To the extent that earning differentials reflect differences in human capital formation, this empirical evidence thus corroborates that the military draft imposes dynamic costs in the form of a lower labor productivity.

There is a substantial body of literature, surveyed, e.g., by Ram (1995), Deger and Sen (1995), and Dunne et al. (2005), on the nexus between military expenditure and economic growth. By and large, military spending does not seem to contribute positively to economic well-being and growth. Some studies have found that especially at low levels of economic development military expenditure may go along with positive externalities (e.g., public infrastructure development, technology spillover effects) that promote economic growth (Crespo-Cuaresma and Reitschuler, 2003; Hooker and Knetter, 1997; Heo, 1998). These studies mainly employ the so-called Feder-Ram model; other studies, using mainstream growth models, do not identify statistically significant effect of military growth on growth or even show clear negative impacts (e.g., Knight et al., 1996). Reviewing the literature, Dunne et al. (2005) conclude that the Feder-Ram model suffers from serious problems. Dunne et al. (2005) advocate using, instead, mainstream growth models, like the augmented Solow model that we use in our analysis.

As argued by Stroup and Heckelman (2001), the impact of the military use of an economy's labor force on economic growth may be non-linear and depend on the overall quality of human capital: With higher educational attainment, the opportunity costs of displacing young men from the private sector workforce to the military is high, resulting in reduced economic prosperity. With low educational attainment of the young male workforce, spending a certain time in the military may indeed increase the quality of human capital by providing training opportunities, e.g., self-discipline, communicative skills, or problem-solving techniques. Stroup and Heckelman (2001) indeed find empirical support for Africa and Latin America that recruitment to the military has higher and adverse effects on economic growth in countries with high educational standards. However, they do not relate their estimates to whether the countries in question were running professional armies or used conscription.

4 Model and Data

We construct an augmented Solow growth model which assumes that the production process uses physical capital, human capital, labor, and R&D:

$$Y(t) = A(t, \mathbf{m}) \cdot K(t)^{\alpha} \cdot H(t)^{\beta} \cdot R(t)^{\gamma} \cdot L(t)^{1-\alpha-\beta-\gamma}$$

All inputs receive a positive factor share, i.e., $\alpha, \beta, \gamma, 1-\alpha-\beta-\gamma > 0$. For year t, $Y(t)$ denotes the gross domestic product, $K(t)$ and $L(t)$ represent the amounts of physical capital and non-augmented labor employed in the production, $H(t)$ captures the stock of human capital, and $R(t)$ measures the stock of know-how created by R&D. The variable $A(t, \mathbf{m})$ measures total factor productivity which depends on $\mathbf{m}$, a vector of military variables (see below). A similar Solow-type approach was used by Knight et al. (1996) to test for the impact of military spending on economic growth.

The labor force grows at an exogenous and constant rate n. Moreover, the economy is assumed to travel along a balanced growth path where it devotes constant shares s_k, s_h, and s_r of GDP to investments in physical, human, and knowledge-created capital. Assuming an equal rate δ of depreciation for human and physical capital and R&D, one obtains (for details see Mankiw et al. (1992) and Nonneman and Vanhoudt (1996)):

$$\begin{aligned}\ln[Y(t)/L(t)] &= \frac{1}{(1-\alpha-\beta-\gamma)} \ln A(0,\mathbf{m}) + \frac{g \cdot t}{(1-\alpha-\beta-\gamma)} \\ &\quad - \frac{(\alpha+\beta+\gamma)}{(1-\alpha-\beta-\gamma)} \cdot \ln(n+g+\delta) + \frac{\alpha}{(1-\alpha-\beta-\gamma)} \cdot \ln(s_k) \\ &\quad + \frac{\beta}{(1-\alpha-\beta-\gamma)} \cdot \ln(s_h) + \frac{\gamma}{(1-\alpha-\beta-\gamma)} \cdot \ln(s_r),\end{aligned}$$

where g is the balanced growth rate. As argued by Bernanke and Gürkaynak (2001), this framework can be used to evaluate essentially any growth model that admits a balanced growth path (also endogenous growth models).

Following Mankiw et al. (1992) and Nonneman and Vanhoudt (1996), we approximate the above equation by a Taylor expansion around the steady-state and solve the resulting differential equation. We then obtain the following estimable equation for the growth of per-capita GDP:

$$\begin{aligned}\ln[Y(t)/L(t)] - \ln[Y(0)/L(0)] &= (1-e^{-\lambda t})(\ln A(0,\mathbf{m}) + g \cdot t) \\ &\quad +(1-e^{-\lambda t})\frac{\alpha}{1-\alpha-\beta-\gamma} \ln(s_k) \\ &\quad +(1-e^{-\lambda t})\frac{\beta}{1-\alpha-\beta-\gamma} \ln(s_h) \\ &\quad +(1-e^{-\lambda t})\frac{\gamma}{1-\alpha-\beta-\gamma} \ln(s_r) \\ &\quad -(1-e^{-\lambda t})\frac{\alpha+\beta+\gamma}{1-\alpha-\beta-\gamma} \ln(n+g+\delta) \\ &\quad -(1-e^{-\lambda t}) \ln[Y(0)/L(0)]\end{aligned}$$

where $\lambda := (1-\alpha-\beta-\gamma)(n+g+\delta)$ is the rate of convergence.

We use data for the group of 21 OECD[3] countries, also used in Mankiw et al. (1992), extending the time period from 1960 to 2000, however. The dependent

[3] These are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. Germany is omitted due to its reunification.

variable is for income levels the natural logarithm of real per-working-age-person GDP in 2000. For growth regressions, the dependent variable is the difference in the logarithm of GDP per working-age person between 2000 and 1960. Data sources are listed in the Appendix.

In the growth regressions, the natural logarithm of initial real GDP per working-age person in 1960 is given. We proxy s_h by the average share of the working-age population in secondary education over this time, i.e., the ratio of those enrolled in secondary education to those of high school age times the share of the working-age population of high school age. R&D is the natural logarithm of R&D expenditures, and investment denotes the natural logarithm of investment in physical capital, both measured as the average of their shares of GDP between 1960 and 2000, or as far back as available for R&D.

Following Mankiw et al. (1992), Nonneman and Vanhoudt (1996) and Bernanke and Gürkaynak (2001), we estimate $\ln(n + g + \delta)$ by adding 0.05 (of which the technology growth rate is 0.02 and the depreciation rate is 0.03) to the average annual growth rates of the working-age populations between 1960 and 2000.

As suggested by theory, military recruitment and expenditures may impact output and growth. Here, we hypothesize that these variables affect growth per person of working age. In particular, we include the following regressors: a dummy for whether conscription was enforced or not, the number of conscripts as a share of the labor force, the duration of conscription (in years), each measured for the year 1985, and the duration of alternative service for as early as available While growing over time, the fraction of recruited draftees who actually deliver alternative service has been rather low in most countries.[4] Yet, we include the length of alternative service as a regressor. In all countries, alternative service has been considerably longer than ordinary military service. Moreover, there is a selection effect that the better educated people may be more likely to opt for alternative service, rendering the impact of alternative service more important than the population share of those choosing such service suggests.

In addition to features of military conscription, we include the size of the military sector (also for 1985) in the analysis, captured both by the logarithm of military expenditures as a share of GDP and by the logarithm of the share of staff in the military as a share of the total labor force.

Table 1 summarizes descriptive statistics on the use of conscription and military expenditures. Fourteen out of the 21 OECD countries in our sample relied on conscription in 1985. The average length of conscription was 12.7 months in the countries which used it, while alternative service on average lasted 1.2 months longer (excluding Turkey which did not allow for alternative service). On average countries with conscription drafted 1.21 percent of their labor force to the mili-

[4]For the countries in our sample, WRI (2005) reports shares between 3 and 10 percent for the 1990s, with exceptions including Austria (more than 20 percent) and Italy (more than 50 percent).

tary. Standard deviations of the variables are considerable. Underlying these, the longest spell of draft was in Greece, averaging 22.6 months. The length of draft in 1985 exceeded one year also in Turkey, Portugal, the Netherlands, Spain, Norway and Italy. In Greece, conscripts as a share of the labor force constituted 3.31 percent and in Turkey 2.57 percent. While military expenditures as a share of GDP were similar at about 2.6 percent in countries with and without conscription, the former had a considerably larger share of their labor force employed as military staff than countries with a professional army (2 percent versus 0.9 percent).

5 Results

Our analysis suggests that military conscription impacts negatively both the level and the growth of GDP per working-age person in OECD countries.

Tables 2 to 4 report OLS regression results for income levels. Enforcing the military draft depresses income, although not significantly so at conventional levels. The number of conscripts and the length of conscription spells have statistically highly significant negative impacts on GDP (at the 1 or 5 percent levels). The duration of alternative service only shows statistical significance when inflation is given (but at the 1 percent level).

Tables 5 to 7 show the results of the growth regressions. Running a draft scheme turns out to hamper growth statistically significantly (at the 10 or 5 percent level). As with GDP levels, the share of conscripts of the labor force and the time spent in conscription have statistically significant negative effects also on economic growth. The coefficient on the conscription share of the labor force is the largest in both the income and growth regressions (-22.151 in Table 5). Again, the length of alternative service only exhibits a statistically significantly negative impact when the effect of inflation is controlled for.

If the numerical conscription variables (i.e., the share of conscripts in the labor force, the duration of military service and the duration of alternative service) were individually decreased by one standard deviation (0.009, 0.591, 0.803 respectively), it would on average for an OECD country increase the log difference growth of GDP per working-age person over the 40-year time period explored, 1960-2000, by 19.185, 10.696 and 11.957 percent, respectively (or by 0.48, 0.27 and 0.3 percent yearly, respectively). Thus, the share of conscripts in the labor force has the largest impact, followed by the duration of the military service and the alternative service. This conforms to the intuition that the more intensely conscription is enforced, the less effective labor is spent on endeavors more productive to the economy, and the lower are output and its growth.

Observe that, due to the considerable magnitudes of standard deviations in our sample, the aforementioned reductions in draft-related variables would, for quite a number of countries with conscription, render their draft scheme virtually meaningless. We, thus, might interpret our estimates of increases in GDP growth rates by between 0.27 and 0.48 percent as lower bounds for the effects of abolishing military conscription entirely.

We calculate the implied rates of convergence (λ in the tables) as in Mankiw et al. (1992), extending their estimation period and including military variables and other control variables. Our estimated rate of convergence for the OECD countries is between 3.19 and 7.25 percent. Keller and Poutvaara (2005) estimate that the rate of convergence is between 3.43 and 5.56 with Solow model augmented by human capital and R&D, depending on whether additional control variables are added. They do not include variables related to conscription. Therefore, including the role of conscription increases the estimated rate of convergence.

There is no sign that military expenditures *per se* or the size of the army, relative to the population, statistically significantly impact income or growth. This is in line with the inconclusive evidence on the relationship between defence expenditure and growth that emerges from similar linear growth models as the one employed here (see Dunne et al., 2005).

Overall, the augmented Solow model with military variables and R&D explains much of per-working-age-person GDP and its economic growth for OECD countries with adjusted R^2s varying between 71 and 90 percent in income regressions and between 80 and 90 percent in growth regressions. This is generally an increase compared to when the military variables are excluded, where adjusted R^2s are 0.734 for income levels and 0.796 for the growth regressions (Keller and Poutvaara, 2005).

6 Sensitivity Analysis

Temple (1998) suggests that the results by Mankiw et al. (1992) are driven by included outliers, at least for the OECD sample. Keller and Poutvaara (2005) find that excluding outliers does not change the results when R&D is included, which it is not in Mankiw et al. (1992) and Temple (1998). We perform a similar analysis when military variables are included, with usually even more highly significantly negative results at the 1 and 5 percent levels for the military variables, including the duration of alternative service, while the conscription dummy sometimes is of lower significance. To reduce the influence of potential outliers, we conduct least median of squares (LMS) regressions for the main models in Tables 2 and 5. The results are generally similar, except for the alternative service duration whose influence turns insignificantly positive for levels of income. Moreover, least absolute value (LAV) or least absolute deviation regressions are applied, which use the full samples but diminish the influence of potential outliers. The signs and magnitude of the coefficients for these regressions are similar as well, although the significance of the military variables is somewhat lower. However, the conscripts' share of the labor force is still highly significantly negative at the 1 percent level to income.

Finally, we also replicated the analysis using an augmented Solow growth model that was initially suggested by Mankiw et al. (1992). That is, we excluded R&D from the analysis. Also in this case, we find that the conscription dummy, the share of conscripts in the labor force, and the lengths of conscription and alternative service have a negative impact on the level and growth of GDP. The effect is usually statistically significant at least at the 5 percent level, and often at the 1 percent level.

7 Conclusion

Economic theory predicts that military conscription is associated with static inefficiencies as well as with dynamic distortions of the accumulation of human and physical capital. Relative to an economy with an all-volunteer force, output levels and growth rates are expected to be lower in countries that rely on military draft to recruit their army personnel. For OECD countries, we show that military conscription indeed has a statistically significant negative impact on economic performance. Thus, the losses in individual lifetime earnings, which a number of microeconometric studies observe for former conscripts, indeed translate into substantial reductions in income and growth on the macroeconomic level, rendering military conscription a socially unnecessarily costly way of military recruitment.

The result that military conscription has a negative impact on GDP and on its growth is robust in various specifications. We measured the impact of conscription by a dummy variable, by the labor force share of conscripts, and by the duration of conscription or of alternative service. With all these variables, conscription has a consistently negative and usually statistically significant effect. The variable military expenses as such even varies in sign. When R&D is omitted the military variables added to the Mankiw et al. (1992) are almost always of even stronger significance at the 1 or 5 percent levels. The coefficients are generally of similar magnitude also in smaller samples when potential outliers are excluded or their effects diminished.

To conclude, at least OECD countries would be ill advised to rely on military draft. This verdict is strengthened by recent research on the political virtues which its advocates tend to attribute to military conscription. Such potential advantages include that military draft embeds democratic controls in the army or reduces the likelihood of war. However, analyzing militarized interstate disputes from 1886 to 1992, Choi and James (2003) find that a military manpower system with conscripted soldiers is associated with more military disputes than professional or voluntary armies.[5] Hence, in addition to an increase in annual GDP growth of between a quarter and half a percentage point which we find an

[5]Based on cross-sectional data from 1980, Anderson et al. (1996) conclude also that "warlike" states are more likely to employ conscription.

average OECD country with military draft foregoes, abolishing conscription even seems to go along with a peace dividend.

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Appendix: Data Sources

Unless stated otherwise below, data is taken from World Bank (2003).

Variables	Source
Real GDP	Heston et al. (2000)
working age population (high school age, 15-19)	United Nations (2003)
share of military staff in total labor force	World Bank (2004)
conscripts as share of total labor force	World Bank (2004)
other military variables	IISS (1985)
alternative service time	OMHROI.gr (2005); Italy: WRI (1998); Belgium, the Netherlands, Spain, France: EBCO (2001).

Table 1: Descriptive Statistics on Conscription and Military Expenditure

	Mean			Std. Dev.
	overall	with conscription*	without conscription	
Length Military Conscription		1.056 yrs		0.591 yrs
Length Alternative Service		1.160 yrs		0.802 yrs
Conscripts/Labor Force		0.012		0.009
Military Staff/LaborForce	0.017	0.020	0.009	0.575
Military Expenditures/GDP	0.026	0.026	0.026	0.461

* 14 out of 21 countries used conscription in 1985.

Table 2: Income Levels and Military Conscription

Dependent Variable: Log-GDP per working-age person in 2000

Constant	11.459	11.604	11.350	12.229
	(1.544)***	(1.123)***	(1.468)***	(1.593)***
Investment/GDP	0.323	0.352	0.347	0.312
	(0.295)	(0.256)	(0.275)	(0.295)
Population Growth $+0,05$	-0.714	-0.521	-0.697	-0.611
	(0.465)	(0.365)	(0.430)	(0.545)
Education	0.585	0.515	0.600	0.800
	(0.283)*	(0.222)**	(0.232)**	(0.264)***
R&D/GDP	0.306	0.216	0.228	0.304
	(0.063)***	(0.080)**	(0.078)***	(0.097)***
Conscription Dummy	-0.163			
	(0.122)			
Conscripts/Labor Force		-13.494		
		(5.351)**		
Length of Military Service			-0.175	
			(0.080)**	
Length of Alternative Service				-0.0581
				(0.049)
$\bar{R}^2$	0.762	0.798	0.781	0.730
F-stat.	13.833***	16.829***	15.278***	11.830***

Note: *(**)[***] denotes significance at the 10% (5%) [1%] level; standard errors in parentheses; 21 observations.

Table 3: Income Levels, Conscription, and Military Variables

Dependent Variable: log-GDP per working-age person in 2000

Constant	11.065 (2.019)***	14.593 (1.338)***	12.504 (2.086)***	12.461 (2.029)***
Investment/GDP	0.374 (0.262)	0.672 (0.148)***	0.530 (0.199)**	0.463 (0.246)*
Population Growth +0.05	-0.694 (0.546)	-0.116 (0.332)	-0.701 (0.566)	-0.810 (0.640)
Education	0.615 (0.349)*	0.486 (0.195)**	0.678 (0.258)**	0.933 (0.347)**
R&D/GDP	0.312 (0.090)***	0.184 (0.064)***	0.204 (0.082)**	0.272 (0.093)**
Military Expenditure/GDP	0.028 (0.107)	0.069 (0.072)	0.101 (0.101)	0.125 (0.122)
Military Staff/Labor Force	0.032 (0.127)	0.262 (0.133)*	0.078 (0.125)	-0.023 (0.170)
Conscription Dummy	-0.163 (0.142)			
Conscripts/Labor Force		-31.682 (7.686)***		
Length of Military Service			-0.281 (0.107)**	
Length of Alternative Service				-0.096 (0.099)
$\bar{R}^2$	0.732	0.862	0.788	0.711
F-stat.	8.806***	18.958***	11.634***	8.018***

Note: *(**)[***] denotes significance at the 10% (5%) [1%] level; standard errors in parentheses; 21 observations.

Table 4: Income Levels, Conscription, Military Variables, and Inflation

Dependent Variable: Log-GDP per working-age person in 2000

Constant	10.402	12.772	10.901	10.781
	(1.667)***	(1.309)***	(1.662)***	(1.392)***
Investment/GDP	0.034	0.352	0.170	0.216
	(0.259)	(0.196)*	(0.222)	(0.173)
Population Growth +0.05	-0.351	-0.043	-0.403	-0.577
	(0.378)	(0.256)	(0.403)	(0.425)
Education	0.397	0.397	0.485	0.706
	(0.294)	(0.188)*	(0.233)*	(0.247)**
R&D/GDP	0.137	0.099	0.082	0.054
	(0.061)**	(0.060)***	(0.061)	(0.046)
Military Expenditures/GDP	0.048	0.079	0.101	0.136
	(0.103)	(0.066)	(0.086)	(0.072)*
Military Staff/LaborForce	0.057	0.199	0.071	-0.104
	(0.122)	(0.121)	(0.097)	(0.113)
Inflation	-0.381	-0.253	-0.333	-0.442
	(0.098)***	(0.105)**	(0.091)***	(0.092)***
Conscription Dummy	-0.138			
	(0.126)			
Conscripts/Labor Force		-22.682		
		(8.132)***		
Length of Military Service			-0.185	
			(0.076)**	
Length of Alternative Service				-0.153
				(0.069)**
$\bar{R}^2$	0.848	0.899	0.867	0.871
F-stat.	14.992***	23.229***	17.308***	17.852***

Note: *(**)[***] denotes significance at the 10% (5%) [1%] level; standard errors in parentheses; 21 observations.

Table 5: Growth and Military Conscription

Dependent Variable: Log-difference in GDP per working-age person; 1960-2000

Constant	7.967 (2.201)***	8.855 (1.550)***	8.413 (1.827)***	8.491 (1.886)***
Initial GDP	-0.754 (0.105)***	-0.797 (0.096)***	-0.782 (0.097)***	-0.748 (0.102)***
Investment/GDP	0.347 (0.194)*	0.350 (0.196)*	0.349 (0.196)*	0.340 (0.218)
Population Growth +0.05	-0.917 (0.435)*	-0.671 (0.289)**	-0.828 (0.376)**	-0.831 (0.460)*
Education	0.517 (0.242)*	0.506 (0.219)**	0.565 (0.211)**	0.717 (0.257)***
R&D/GDP	0.167 (0.097)	0.126 (0.104)	0.125 (0.104)	0.160 (0.113)
Conscription Dummy	-0.154 (0.081)*			
Conscripts/Labor Force		-10.625 (4.080)**		
Length of Military Service			-0.140 (0.057)**	
Length of Alternative Service				-0.056 (0.041)
$\bar{R}^2$	0.826	0.834	0.825	0.796
F-stat.	16.842***	17.714***	16.745***	13.984***
Implied λ	0.0351	0.0399	0.0381	0.0345

Note: *(**)[***] denotes significance at the 10% (5%) [1%] level; standard errors in parentheses; 21 observations.

Table 6: Growth, Conscription, and Military Expenditure

Dependent Variable: Log-difference in GDP per working-age person; 1960-2000

Constant	8.186 (2.235)***	12.348 (2.199)***	9.734 (2.434)***	9.049 (2.518)***
Initial GDP	-0.721 (0.108)***	-0.864 (0.084)***	-0.807 (0.098)***	-0.756 (0.099)***
Investment/GDP	0.377 (0.176)**	0.605 (0.135)***	0.468 (0.153)***	0.435 (0.193)**
Population Growth +0.05	-0.829 (0.475)	-0.234 (0.320)	-0.755 (0.511)	-0.895 (0.544)
Education	0.429 (0.187)**	0.461 (0.173)**	0.604 (0.210)**	0.806 (0.305)**
R&D/GDP	0.195 (0.121)	0.136 (0.086)	0.131 (0.106)	0.159 (0.118)
Military Expenditures/GDP	-0.094 (0.091)	0.024 (0.067)	0.031 (0.101)	0.035 (0.103)
Military Staff/Labor Force	0.141 (0.133)	0.246 (0.134)*	0.095 (0.123)	-0.037 (0.148)
Conscription Dummy	-0.241 (0.103)**			
Conscripts/Labor Force		-27.285 (8.141)***		
Length of Military Service			-0.231 (0.099)**	
Length of Alternative Service				-0.093 (0.089)
$\bar{R}^2$	0.815	0.871	0.816	0.767
F-stat.	12.011***	17.876***	12.121***	9.208***
Implied λ	0.0319	0.0499	0.0411	0.0353

Note: *(**)[***] denotes significance at the 10% (5%) [1%] level; standard errors in parentheses; 21 observations.

Table 7: Growth, Military Variables, and Inflation

Dependent Variable: Log-difference in GDP per working-age person; 1960-2000

Constant	8.897	12.118	10.109	10.163
	(2.345)***	(1.921)***	(2.256)***	(2.231)***
Initial GDP 1960	-0.859	-0.945	-0.928	-0.945
	(0.138)***	(0.091)***	(0.117)***	(0.106)***
Investment/GDP	0.129	0.369	0.200	0.232
	(0.254)	(0.200)*	(0.226)	(0.178)
Population Growth +0.05	-0.513	-0.100	-0.455	-0.617
	(0.441)	(0.301)	(0.440)	(0.458)
Education	0.363	0.399	0.485	0.698
	(0.257)	(0.193)*	(0.241)*	(0.266)**
R&D/GDP	0.124	0.092	0.072	0.053
	(0.078)	(0.068)	(0.072)	(0.053)
Military Expenditures/GDP	-0.019	0.059	0.075	0.115
	(0.116)	(0.075)	(0.100)	(0.119)
Military Staff/Labor Force	0.106	0.201	0.078	0.106
	(0.126)	(0.125)	(0.102)	(0.119)
Inflation	-0.276	-0.218	-0.285	-0.402
	(0.146)*	(0.133)	(0.132)*	(0.135)***
Conscription Dummy	-0.178			
	(0.146)*			
Conscripts/Labor Force		-22.151		
		(8.155)**		
Length of Military Service			-0.181	
			(0.132)**	
Length of Alternative Service				-0.149
				(0.074)*
$\bar{R}^2$	0.850	0.890	0.856	0.858
$F-statistics$	13.555***	18.911***	14.230***	14.433***
Implied λ	0.0490	0.0725	0.0658	0.0725

Note: *(**)[***] denotes significance at the 10% (5%) [1%] level; standard errors in parentheses; 21 observations.