

## Why is the Military Draft Common? Conscription and Increasing Returns

Yew-Kwang Ng

*Division of Economics, Nanyang Technological University and Department of Economics, Monash University, Clayton, Australia 3800*  
E-mail: kwang.ng@buseco.monash.edu.au

It is well-known that if the required number of military personnel is large, paying the soldiers their hire may involve very high taxes. While conscription involves the inefficiency and unfairness of violating free choice, it may save significant distortionary costs of taxation. It is not well-known that, even in the absence of these distortionary costs, conscription may reduce the inequity of having very low marginal utilities for soldiers if they are paid enough to attract their voluntary services and very high marginal utilities for civilians if they have to pay very high taxes. Having all citizens serving an equal fraction of time may be inefficient as there are high degrees of increasing returns in military services due to both training costs and learning by doing. Conscription may then increase the expected utilities of all individuals.

*Key Words:* Conscription; Draft; Increasing returns; Efficiency; Equity; Fairness.

*JEL Classification Numbers:* D60, H80, H56.

### 1. INTRODUCTION

The military draft or conscription has been very commonly used throughout history all over the world. In Europe, for example, despite the end of the cold war<sup>1</sup> that prompted a number of countries to phase out conscription and construct all-volunteer forces (AVFs), 'many European countries plan to retain some level of conscription' (Jehn and Selden 2002).<sup>2</sup> This paper advances a specific reason that may partly explain the prevalence of conscription that has escaped the attention of economists who focus on

<sup>1</sup>The increasing sophistication of weapons systems is another reason for eliminating conscription (Warner and Asch 1995, Sands 2001).

<sup>2</sup>However, some of these countries have switched to volunteer forces; see Williams and Gilroy (2006).

the competitive economy with no increasing returns. The existence of important elements of increasing returns and learning by doing in military services may, at least in some cases, make conscription welfare improving even at the costs of violating free choice and fairness.

Basically, the high costs of training and the importance of experience make it efficient for a soldier to serve a long time. Thus, except for the case of a very threatened country, it is generally desirable to confine military service to a fraction of the population. On the other hand, unless this desirable fraction is very small and/or unless the supply price of voluntary soldiers is relatively low (as may be the case when patriotism is high), very high levels of payment and revenue may be needed to call forth the required number of volunteers. This high level of needed revenue gives rise to two problems. One is the possibility of entailing a high amount of excess burden or deadweight/distortionary costs of taxation in raising the required revenue. Recognising this excess burden, Lee and McKenzie (1992), Ross (1994), and Warner and Asch (1996) show that conscription may involve a lower social cost. Poutvaara and Wagener (2007a) also argue that 'the political allure of conscription seems to arise from the possibility to concentrate the tax burden on a minority of voters in a way that is generally held to be unacceptable with normal taxation'. (For studies of the costs and distributive effects of conscription for specific countries, see, e.g. Kerstens & Meyermans 1993, P.S. Ng 2005.)<sup>3</sup> Since this is a well-known point (from at least the time of Friedman 1967), I will abstract this factor away by assuming the feasibility of lump-sum taxes. Rather, I will concentrate on the second point ignored by economists.

The second and not well-known problem of having to pay a very high price to attract a sufficient (from the security and hence welfare-maximization consideration) number of volunteers is the possibility of driving the marginal utility (and hence also the marginal social welfare significance) of the incomes of the soldiers to a very low level in comparison to that of the civilian population, hence violating the requirement of equity (in the sense of equality or at least no big divergence between the marginal social welfare significance of the incomes of different persons. Thus, the presence of high degree of increasing returns creates an either-or (soldiers or civilians) choice, making freedom (free choice of what occupation to take) and equity not simultaneously completely achievable.<sup>4</sup> Sacrificing a bit of both may thus be a welfare-maximizing choice.

Early contributions in the analysis of conscription (e.g. Oi 1967, Hansen and Weisbrod 1967, Friedman 1967, and Altman and Barro 1971) con-

<sup>3</sup>On the inter-generational aspect of conscription, see Poutvaara and Wagener (2007b).

<sup>4</sup>For a more general analysis of this E-F conflict (between efficiency and equity on the one hand and freedom and fairness on the other) and its implications beyond the issue of conscription, see Ng (2009, Ch. 3).

centrated on the very high opportunity costs of conscription and hence were ‘virtually unanimous in their belief that volunteer military forces would have lower social costs and be more efficient than conscripted forces’ (Warner and Negrusa 2005). Later authors (Lee and McKenzie 1992, Ross 1994, and Warner and Asch 1996) put more emphasis on the deadweight losses of taxation mentioned above and hence show that it is possible for a conscripted force to have a lower total social cost.

Opportunity costs are real costs to the society and could be huge and should not be ignored. On top of that, individuals may incur substantial costs trying to evade conscription, as emphasised and analysed by Warner and Negrusa (2005). However, both these types of costs are, at least in principle, very well understood by economists. Thus, partly for simplicity and partly to focus on the main point here, I will again abstract them away by taking a simple case of a homogeneous population with no evasion in the main analysis.

Mulligan and Shleifer (2005) examine the effects of the fixed costs of effecting a military draft in affecting the decision whether to conscript or not, reaching the conclusion that larger countries (which can afford the high fixed costs better) and countries of the French legal origin, which Mulligan and Shleifer see as facing lower fixed and variable administrative costs, tend to opt for conscription. This, in a sense, is relating the increasing returns in military drafts to conscription. However, the point about increasing returns this paper is focusing on is the existence of important increasing returns in the training of soldiers, not in the administration of the draft itself. Thus, to focus on our point here, it is natural to abstract away the administrative costs of conscription. Similarly, other factors that may be relevant to conscription such as interest-group influence (Anderson et al. 1996) and living standards (Van Doorn 1975, Ross 1994) are ignored. Also, all other possible sources of market failure like environmental disruption are abstracted away. (This makes the initial market equilibrium A in Figure 1 below perfectly efficient.)

## 2. ANALYSIS

Consider first the case for the possible desirability of conscription informally before the more formal presentation.

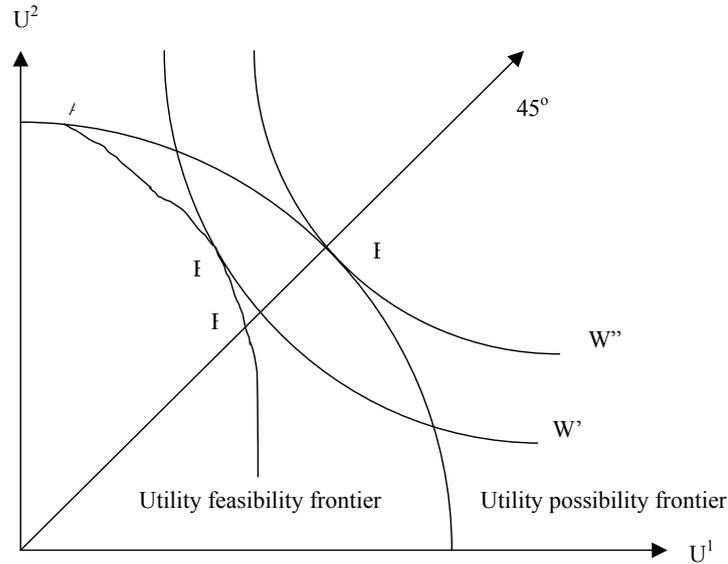
Economists are familiar with the usual need to trade-off efficiency and equity/equality. Perfect efficiency (in the Pareto sense) requires the impossibility of making someone better off without making anyone worse off. In terms of the utility possibility frontier, it requires location at a point on the (downward-sloping) utility possibility frontier instead of at a point inside it. However, any point on the frontier need not be ideal. While it is perfectly efficient, it may involve a high degree of inequality. Thus, if

the initial free market equilibrium involves very unequal distribution of incomes, most people may be willing to accept some redistribution in favour of the poor even though this may involve a decrease in efficiency including administrative and compliance costs and the deadweight losses of the redistributive tax/transfer system. Provided the efficiency losses are more than offset by the equality gain, the change may be welfare improving.

The point may be seen more clearly with reference to Figure 1 where the simple case of two (groups of) individuals 1 and 2 is illustrated. We have social welfare depending on individual utilities,  $W = W(U^1, U^2)$  which yields welfare contours like  $W'$  and  $W''$  depicted in Figure 1. Given the distribution of endowment, suppose that the initial point of free market equilibrium is at  $A$ . If costless lump-sum transfer is feasible, we could (transferring from the rich individual 2 to the poor individual 1) travel along the utility possibility frontier (UPF) to reach the point  $E$  which is both perfectly efficient and perfectly equal. This allows us to reach the highest (along the given UPF) level of social welfare represented by the welfare contour  $W''$ . However, if transfer is costly (both administratively and through imposing compliance costs and disincentive effects), we can only travel along the utility feasibility frontier (UFF). The point of highest social welfare that could be reached is then at  $B$  where the UFF reaches the highest welfare contour  $W'$ . If we insist on perfect equality, we would reach  $F$  which is at a lower welfare contour. In fact, recognizing the likely extremely high costs of disincentive effects when perfect equality is reached, the UFF is likely to be backward bending (not shown), intersecting the 45° equality line at a point Pareto-inferior (south-west of) to  $B$  (or even  $A$ ), making both individuals worse-off. Note that the optimal-feasible point  $B$  has neither perfect equality nor perfect efficiency. Perfect efficiency is obtained at the initial point  $A$  and perfect equality could be obtained at the point  $F$  but both these points are inferior to  $B$ . As perfect efficiency and perfect equality are not simultaneously attainable, it is in general optimal to sacrifice a little of both efficiency and equality so that neither one has to be seriously curtailed. Feasible optimality typically involves trading-off some degree of efficiency to attain some higher level of equality. We want to tax the rich more to help the poor but not by so much as to kill off most incentives.

Now consider the issue of conscription. First consider the real-world situation of heterogeneous preferences where some adventurous young men may positively prefer to become soldiers even at the same incomes as alternative civilian occupations. If the required number of soldiers is not very large, the offer of ordinary salaries may be enough to attract a sufficient number of volunteers. The need for conscription may then not arise. Even in a model of homogeneous individuals, if the required number of soldiers is small, a slightly higher salary may be sufficient to attract the required

FIG. 1. Equality vs. Efficiency



number. It may be mistakenly thought that a model of homogeneous individuals is intrinsically unstable. Either the salary for soldiers is high enough to attract all individuals to join the armed force or it is not high enough to attract a single soldier. This need not be so as the salary can be at such a level that, with the number of soldiers hired, all individuals are indifferent between joining the armed force or remaining in civilian occupations. In a model of homogeneous individuals, there will always be indeterminacy in the sense as to who will be what. However, the number or proportion could be determinate. This may be seen by noting that the salaries in civilian employment are not invariant to the number of people joining the armed force. With less people in the civilian, their marginal productivities will be higher. Thus, even with homogeneous individuals, the supply curve of soldiers is not horizontal but upward-sloping.

In both cases (homogeneous and heterogeneous individuals), if the number of soldiers needed is large, a salary level much higher than that in the civilian employment may be needed to attract a sufficient number of volunteers. Then, even in the absence of the deadweight losses of taxation to raise revenue to pay for the high salary for soldiers, this may create another problem. Soldiers will have very high incomes and civilians very low incomes, creating a disparity. Though the utility levels of soldiers and civilians are the same (thus there is no unfairness) but the marginal utility (and also the social marginal welfare significance) of income of soldiers may

be very low and that of the civilians very high, due to the different income levels. In addition, if we realistically postulate that the opportunities for spending money are lower for soldiers and higher for civilians, this further increases the disparity in the marginal utilities of income between soldiers and civilians. This is a form of inequity similar to the rich-poor disparity discussed above which also involves low marginal utility (and also the social marginal welfare significance) of income of the rich in comparison to that of the poor. (At the original point *A*, the slope of the UPF is rather flat.)

In the absence of increasing returns and learning by doing (which may be viewed as a generalized form of increasing returns) in the training/making of a soldier, the above inequity problem can easily be solved by having all individuals serving as soldiers for some fraction of their life time. However, due to increasing returns, this fractional arrangement will be very inefficient. If the armed forces of a country consist mainly of temporary soldiers of no more than a few months of training and experience, its defense capability will be very low. Thus, it is usually better to have a fraction of people serving as soldiers for much of their working life. We are then faced with the possible inequity problem if the fraction has all to be induced by very high salaries when the demand for military service is high such as in war time.

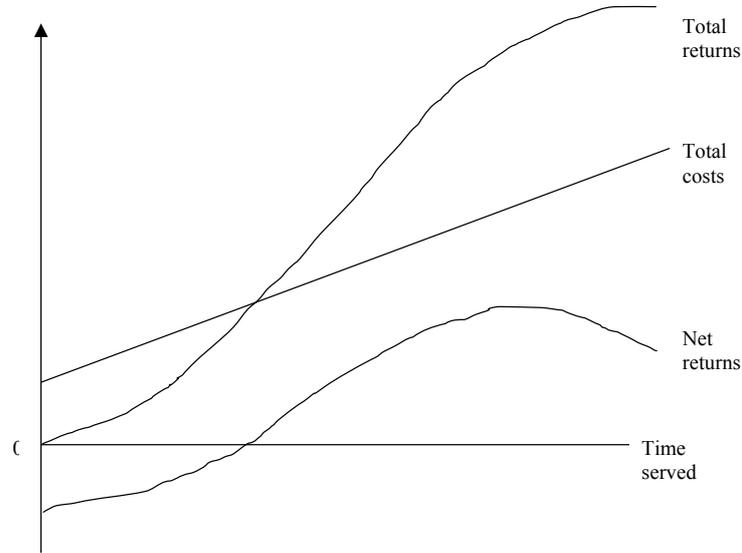
The need to have professional/specialized soldiers due to increasing returns may be illustrated in Figure 2. The horizontal axis measures the time served as a soldier. Due to substantial training costs, the total cost curve starts at a positive intercept with the vertical axis (which measures returns and costs). The total return curve has an initial increasing slope (convex) section due to increasing returns and learning by doing. Eventually, this may no longer prevail due to say diminishing productivities at excessive ages. The net return (= total returns – total costs) curve has thus an initial negative section and may peak at fairly high level (of time served).

In the case of the conflict between efficiency and equity/equality illustrated in Figure 1, as perfect efficiency and perfect equity cannot be simultaneously attained, we are prepared to sacrifice a little of each to have an optimal trade-off at the optimal-feasible point *B*. Similarly, in the presence of a strong degree of increasing returns in military service, perfect equity and perfect freedom (in the choice of military or civilian occupation) cannot be simultaneously attained except by sacrificing efficiency (in military capability) enormously, an optimal trade-off position might be sacrificing a little each of equity, efficiency, and freedom, by having some conscription.

### 3. A SPECIFIC MODEL

To show that conscription could be desirable, a simplified model is constructed to show that conscription may increase the expected utility of

FIG. 2. Increasing returns



all individuals. Since the model is meant to be illustrative only, we will simplify by just taking a case of two identical individuals with simple Cobb-Douglas utility function for the only two goods, a private good food  $X$  and a public good security  $Y$ . The utility function of each individual is given by

$$U = s\alpha \ln x + (1 - s)\alpha' \ln x' + \beta \ln Y \tag{1}$$

where  $s$  is the fraction of time served to produce the public good  $Y$ ,  $x$  and  $x'$  are the amount of the private good consumption when serving and not serving respectively;  $\alpha$ ,  $\alpha'$ , and  $\beta$  are given preference parameters. The values of  $\alpha$  and  $\alpha'$  may be different because of different opportunities of consumption activities for soldiers and civilians.

First consider the case where selective conscription is not practised and both individuals undertake the same fraction  $s$  of time serving. (This is a valid comparison as we have abstracted away issues like individual differences and the excess burden of taxation. If we work with a more realistic model with revenue-raising to pay for volunteers, the additional costs of the excess burden would make the alternative to conscription even less attractive.) We have the following simple production functions

$$Y = 10(s - \bar{s}) \tag{2}$$

$$X = 10 - 10s \tag{3}$$

where  $s$  is the fraction of time each individual serves to produce the public good  $Y$ ,  $\bar{s}$  is the fixed training before service in the army becomes productive; the presence of a positive  $\bar{s}$  signifies the presence of increasing returns. (If using the total amount of working time producing  $X$ , each individual is taken to be able to produce 5 units. No increasing returns in the production of  $X$  are assumed.) We also have the private good allocation constraint

$$2sx + 2(1 - s)x' = X. \quad (4)$$

Maximizing (1) with respect to  $x$ ,  $x'$  and  $s$ , subject to (2) - (4), we have, for the parametric values  $\bar{s} = 0.1$ ,  $\alpha = 1/4$ ,  $\alpha' = 1/2$ ,  $\beta = 1/8$ , the following solution,

$$s \approx 0.3507; x \approx 1.968; x' \approx 3.937; Y \approx 2.507, X \approx 6.493; U \approx 0.619. \quad (5)$$

In contrast, if we allow selective conscription (which may be random to achieve ex-ante fairness; see Bergstrom 1986), we have the possibility of conscripting one of the two individuals to become professional soldier. The utility of the conscripted is

$$U = s\alpha \ln x + (1 - s)\alpha' \ln x' + \beta \ln Y \quad (1a)$$

and that of the non-conscripted who does not serve is

$$U = \alpha' \ln x' + \beta \ln Y. \quad (1b)$$

If both persons face the same probability of 1/2 of having to serve, the expected utility of each person is the same at

$$EU = 1/2s\alpha \ln x + (1 - s/2)\alpha' \ln x' + \beta \ln Y. \quad (1c)$$

The production constraints are

$$Y = 5(s - \bar{s}) \quad (2a)$$

$$X = 10 - 5s \quad (3a)$$

In comparison to (2) and (3) respectively, the change of the relevant figures from 10 to 5 is due to the fact that now only one instead of both persons are serving.

The option of selective conscription allows the expected utility of both individuals to be higher than the optimized utility level without selective conscription given in (5) above. For example, the following solution is feasible.

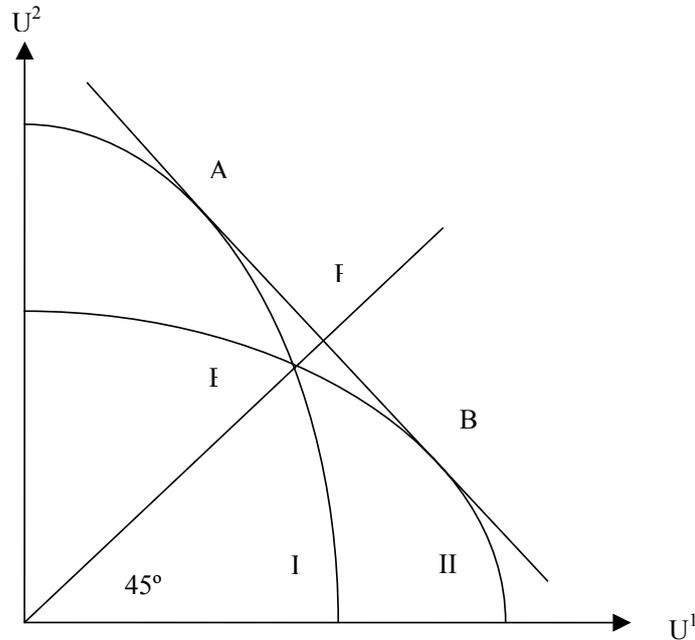
$$s = 0.6; x \approx 2.059; x' \approx 4.118; Y = 2.5, X \approx 7; EU \approx 0.664. \quad (5a)$$

where the expected utility is much higher than the utility level in (5). It may be thought that if individuals are risk adverse in utility, they may prefer a lower but certain utility level to a higher expected utility level. However, as Y.-K. Ng (1984) argues, while one may be rational being rise-adverse with respect to income due to the diminishing marginal utility of income, one cannot be rational in having the diminishing marginal utility of utility.

If we put  $\bar{s} = 0$  for the case with no increasing returns, it can be shown that the optimal choice of the same  $s$  for all individuals provides the optimal solution that cannot be surpassed by allowing selective conscription.

While we put the objective function as the maximization of expected utility for each individual (or for the representative individual), the result is basically the same if the objective is a social welfare function (exactly the same if the social welfare function is utilitarian). This may be shown in Figure 3 in terms of social welfare maximization. Anonymity or symmetry between the two identical individuals is assumed.

FIG. 3.



The two axes of Figure 3 stand for the utility levels of the two individuals. If individual 1 serves in the army, we have the utility possibility curve I prevailing; if individual 2 serves in the army, we have the utility possibility

curve  $\Pi$  prevailing. In whichever case, we can still achieve the egalitarian point  $E$  of equal utility levels for both persons by paying the soldier enough money (through taxing non-soldiers). However, this egalitarian point  $E$  does not maximize the expected utility of either person. Expected utility is maximized by going for point  $A$  if individual 1 serves and for point  $B$  if individual 2 serves. Neither point is Pareto superior to  $E$  ex post. However, by having  $1/2$  probability of either going to  $A$  or  $B$ , the expected utility level achieved is at point  $F$  which Pareto dominates point  $E$  ex-ante.

If the social welfare contours are the utilitarian ones of downward-sloping  $45^\circ$  straight lines (such as line  $AB$  in Figure 3), the social welfare-maximization choice  $A$  or  $B$  coincides with that of expected utility maximization. If the welfare contours are the extreme egalitarian or leximin ones of rectangular shapes, with the angle lying along the  $45^\circ$  ray from the origin (not shown in Figure 3), the choice coincides with the egalitarian point  $E$ . If the social welfare function is intermediate between these two extremes (within the limits satisfying the Pareto principle ex post), the relevant welfare contours are strictly convex to the origin. The optimal choice will then be on the utility possibility curves between  $A$  (or  $B$ ) and  $E$ . Selective conscription will still be involved but with extra payment to the soldier compared to the purely expected utility maximization solution (i.e. point  $A$  or  $B$ ).

#### 4. CONCLUDING REMARKS

Our analysis shows that, in the presence of significant increasing returns (including the need for minimum basic training and the presence of learning by doing) in military training and service, it may be desirable to have selective conscription where a fraction of the population are required, perhaps by a random draft, to serve in the armed forces. Though this almost unavoidably creates inefficiency, violating free choice, and creates unfairness, its efficiency in tapping the increasing returns in military service more may yet offset its costs. Nevertheless, the efficiency costs of forced conscription may be very high both in its violation of freedom and in its resultant misallocation. The ex-post unfairness involved may also be undesirable. Thus, despite its popularity, conscription may well have been used to an excess in most cases. Where a volunteer force is adequate, conscription may well be an inferior choice. Nevertheless, where the degree of increasing returns is high and the required amount of military service is large such as for a country at war, the desirability of conscription cannot be completely excluded. This paper focuses on this case and explains the rationale for the possible desirability of conscription that has been ignored by economists.

As our analysis suggests that the case for conscription is higher if the degree of increasing returns in military service is high and the required amount of military service is large, a natural avenue for future research is

to examine whether the actual extent and prevalence of conscription are related to such variables. (White 1989 shows that having conscription is associated with a country having 34% more personnel in its armed forces.) However, the actual empirical studies are best left to unbiased researchers, not to mention the lack of expertise of the present author in this area.

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