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Can a draft induce more human capital investment in the military?

Tim Perri
Department of Economics, Appalachian State U.

Abstract

We consider the possibility a draft increases the likelihood individuals will invest in human capital in the military. This possibility exists because those drafted have less time to reap the return from human capital investment since, with a volunteer military, one need not enlist. A draft is more likely to increase human capital investment in the military the larger the civilian return to human capital investment, the shorter the additional time one must spend in the military if one invests while enlisted, and the larger the cost to an individual of obtaining a deferment.

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Contact: Tim Perri - perritj@gmail.com.
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1. Introduction

Recent research has shown how military conscription---the draft---can adversely affect individual investment in human capital investment.[1] However, human capital investment also occurs within the military. In particular, information technology (IT) workers have become more important in the military. In the U.S. in 2001, about 5% of recruits were to what are considered *IT core* jobs: information systems operators, network analysts, and small computer specialists. An additional 13% of recruits were to *IT related* occupations such as navigators and radar operators (Hosek *et. al.*, 2004).

Computer skills may become more valuable than even the elite special forces personnel (Delta Force, Navy Seals, Green Berets, etc. in the U.S.). Berk and Lipow (2008) argue the most valued soldiers in the Israeli Defense Forces (IDF) are in the unit that engages in computer hacking. The Israeli computer corps, Mamram, rejects 90% of applicants, and requires a nine month training period and a six year enlistment[2] (versus an enlistment of three years for males and two years for females required of Israeli citizens after age eighteen). After military service, many former Mamram members found IT firms[3] (New York Times, 1999, and Berk and Lipow, 2008).

Berk and Lipow (2008) argue one of the main reasons the IDF's general staff opposes a volunteer military is they believe they would not able to recruit the high ability individuals they currently attract in Mamram. Note, although the IDF relies on a draft, individuals drafted into the IDF volunteer for Mamram.

The purpose of this paper is to consider a theoretical model in which individuals can choose to invest in human capital during military service, or can invest outside of the military. The disadvantage of investment as a civilian is individuals must incur a cost for such investment.[4] The disadvantage of investing in the military is one may be required, as in Mamram, to serve a longer period in the military.

We are not interested in the possibility those who have already obtained a good deal of human capital will enlist in the military because the issue is one of whether individuals invest in skills in the military---such as computer skills---that are of value both in the military and in civilian employment. In our model, with a volunteer military, those who wish to invest in such skills either invest as civilians and never enlist, or enlist and invest in the military. With a draft, individuals either invest in skills while in the military, or invest after they leave the military.

We also ignore differences in ability, and whether the draft might attract those who are more able. That issue is considered in Perri (2011).

In the next section, the basic model is developed. In Section 3, deferments are considered. Section 4 contains a summary of the main results.

2. The model

2.1. Basic variables

[1] These papers include Lau and Poutvaara (2004), Cipollone and Rosolia (2007), Poutvaara and Wagener (2007), and Keller, Poutvaara, and Wagener (2009, 2010).
[2] New York Times, 1999.
[3] These include Check Point Software Technologies Ltd., Memco Software Ltd., and Vanguard Security technologies.
[4] Clearly one positive aspect of military service, with a draft or a volunteer military, is the benefit a veteran can receive of payment for education post-military. We generally ignore educational subsidies received by those who have served in the military since the focus of our investigation is on those who either invest in skills in the military or as civilians, when the skills are the same. See footnote seven and Section 4 for more discussion of this point.

Suppose an individual who is drafted and does not invest in human capital serves for a period of length l_1. We ignore volunteers when there is a draft. With a volunteer military, an individual who does not invest in human capital serves for a period of length l_2. With either a draft or a volunteer military, an individual who invests in human capital while enlisted serves for a period of length l_3. It is assumed $0 < l_1 \leq l_2 < l_3 < 1$, where potential work life (in or out of the military) is normalized at one. When the draft was last used in the U.S., draftees were required to serve for two years. The volunteer U.S. military typically requires a four year enlistment, with longer periods for those receiving specialized training.[5] What is important for our considerations is the fact $l_1 < l_3$. As will be shown, l_2 is unimportant for our analysis.

Let ω equal civilian earnings with no human capital investment, where ω is the same for all individuals. Suppose all have the same disutility from being in the military, δ. Let W_S equal the civilian wage for one who has invested in human capital as a civilian or in the military, $\omega < W_S$. Let h equal the cost to an individual of civilian human capital investment. The time required for investment in human capital is not explicitly considered, but is implicitly included in h. Note ω, W_S, and δ are defined for one's potential work life, equal to one, and h is a one-time amount. Discounting is ignored.

2.2. A volunteer military.

The U.S. military has no skill-based special pay (Hosek *et. al.*, 2004), so we assume an individual is paid the same in the military whether or not he has acquired human capital.[6] Thus, with a volunteer military, it makes no sense for an individual to volunteer, serve for a period of l_2, and then, post-military, invest in human capital as a civilian. An individual who wishes to invest in human capital as a civilian will do so at the beginning of work life in order to reap the higher earnings for the longest possible period.[7]

In order to attract enlistees, a volunteer military must pay a wage equal to $\omega + \delta$, which gives those in the military the same compensation (net of disutility of service) as civilians, ω. Thus, absent human capital investment in the military, an individual is indifferent to volunteering or remaining a civilian. As opposed to not enlisting, an individual will invest in human capital as a civilian if $W_S - h \geq \omega$. It is assumed h varies in the population. If one invests in the military, total compensation is $\omega l_3 + W_S(1 - l_3)$: the individual only pays for human capital acquired in the military by extending military service by the amount $l_3 - l_2$. Volunteering and investing in human capital in the military is preferred to investing as a civilian if:

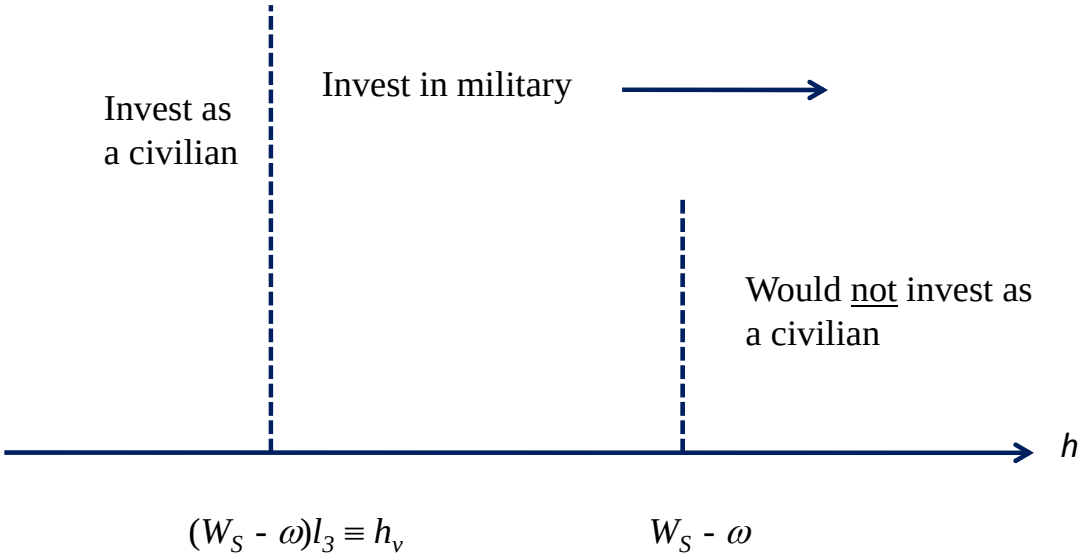
$$W_S - h < \omega l_3 + W_S(1 - l_3),$$
$$\text{or } (W_S - \omega)l_3 \equiv h_v < h. \qquad (1)$$

Figure One illustrates the optimal choices for one with a volunteer military. With a volunteer military, one with low cost of investing in human capital as a civilian will choose not

[5] There is a two year enlistment option which usually requires one to serve in the reserves or the National Guard.
[6] Allowing for higher military pay for those with greater skills will not affect the main result in this paper, which is there are some situations when a draft might induce more human capital investment in the military.
[7] Clearly many enlist in the military in the U.S. today in order to use educational benefits post-military. However, we are interested in human capital acquired in the military, when an individual's alternative is to invest as a civilian (as with IT skills), so we ignore educational benefits. As long as education post-military would replace investment in human capital in the military, educational subsidies clearly reduce the incentive for individuals to invest in the military.

to enlist, and will invest as a civilian. One with somewhat higher cost of investing in human capital as a civilian would be willing to invest as a civilian, but will prefer to enlist and invest in the military. One with even higher cost of investing as a civilian will enlist and invest in the military, but would not invest as a civilian.

Figure 1. A Volunteer Military.



2.3 A draft.

With a draft, we ignore the possibility of volunteers. Draftees are paid less than volunteers or else there would be no reason for a draft. Let pay equal a fraction z, $0 < z < 1$, of what one would earn with a volunteer military, $\omega + \delta$. Thus, while in the military with a draft, total compensation (including the disutility of military service) is (per unit of time) $z(\omega + \delta) - \delta = z\omega + (z - 1)\delta < \omega =$ net compensation with a volunteer military. If drafted, one who invests in human capital in the military receives lifetime compensation of $[z\omega + (z - 1)\delta]l_3 + W_S[1 - l_3]$. If drafted, one who does not invest in human capital in the military, but invests later,[8] has lifetime compensation of $[z\omega + (z - 1)\delta]l_1 + W_S(1 - l_1) - h$. One who is drafted and never invests in human capital has lifetime compensation of $[z\omega + (z - 1)\delta]l_1 + \omega(1 - l_1)$. One prefers investment in the military to never investing if:

$$[z\omega + (z - 1)\delta][l_3 - l_1] + W_S[1 - l_3] > \omega(1 - l_1). \quad (2)$$

[8] It is irrelevant whether the individual invests as a civilian before serving for a period of l_1 with a draft. What matters is military service of length l_1 (when one does not invest in the military and extend service time) reduces the time one can earn the higher wage, W_S, that is paid to those who invest in human capital.

In the Appendix, it is shown *ineq.*(2) is likely to hold for plausible values for variables. Thus, we ignore the possibility of never investing in human capital for draftees. If drafted, investing in human capital in the military is preferred to investing post- military if:

$$[z\omega + (z - 1)\delta]l_3 + W_S[1 - l_3] > [z\omega + (z - 1)\delta]l_1 + W_S(1 - l_1) - h,$$
$$\text{or if } [W_S - z\omega - (z - 1)\delta][l_3 - l_1] \equiv h_d < h. \quad (3)$$

2.4. A draft versus a volunteer military.

If $h_v > h_d$, we are more likely to have investment in the military with a draft than with a volunteer military. For $h_v > h_d$, we must have:

$$\frac{1}{l_1}\{[(1 - z)l_3 + zl_1]\omega + [l_3 - l_1][1 - z]\delta\} < W_S. \quad (4)$$

If $z \to 1$, *ineq.*(4) reduces to $\omega < W_S$. If the draft wage approaches the volunteer wage, we are more likely to get human capital investment in the military with a draft. The reason is, with either a draft or a volunteer military, if $z = 1$, lifetime compensation when one invests in the military is $\omega l_3 + W_S(1 - l_3)$. Investment in human capital post-military with a draft yields lifetime compensation, for one who is drafted, of $\omega l_1 + W_S(1 - l_1) - h$. With a volunteer military, never enlisting and investing in human capital at the beginning of work life yields compensation of $W_S - h > \omega l_1 + W_S(1 - l_1) - h$. The net compensation difference between investing in and out of the military is larger with a volunteer military because the alternative for potential volunteers is to invest and never enlist, whereas a draftee's alternative is to invest outside the military and have less time to reap the return. Thus, a larger range of h is consistent with investing as a civilian with a volunteer military than with a draft, so a draft is more likely to induce investment in human capital in the military if $z = 1$.

In general, when $z < 1$, consider when the draft is more likely to lead to investment in human capital in the military.

When W_S is larger. With a volunteer military, investing in the military versus investing as a civilian involves lost income of $l_3 W_S$. The loss with a draft from investing in the military instead of investing later is $(l_3 - l_1)W_S$, so an increase in W_S implies less of an increase in foregone income with a draft than with a volunteer military from investing in the military.

When ω is smaller. A reduction in ω means lower military pay. The opportunity cost of investing in the military for a draftee is $(l_3 - l_1)(W_S - z[\omega + \delta])$, and for a volunteer is $l_3(W_S - \omega - \delta)$, since the alternative for a volunteer is to not enlist. Thus, the opportunity cost of investing in the military is increased more for a volunteer as ω falls.

When l_3 is smaller or l_1 is larger. A decease in l_3 means the net income foregone from investing in the military is lower. For a one unit decease in l_3, this cost is reduced by $W_S - \omega$ with a volunteer military, but is reduced by the amount $W_S - z\omega - (z - 1)\delta$ with a draft. Now $W_S - z\omega - (z - 1)\delta > W_S - \omega$ if $(\omega + \delta)(1 - z)$ which is true with $z < 1$. Because of lower earnings in the military with a draft than with a volunteer military, a reduction in the time one must serve if one invests in human capital in the military has a bigger impact on net foregone income with a

draft than with a volunteer military, so the likelihood one would invest in the military with a draft when one would not do so with a volunteer military is increased. An increase in l_1 has the same effect as does a decrease in l_3.

When δ is smaller or z is larger. A change in the disutility of being in the military, δ, has no effect with a volunteer military since the wage fully adjusts as δ changes. Since compensation (including disutility) with a draft equals $z\omega + (z - 1)\delta \equiv j$, and $\frac{\partial j}{\partial \delta} < 0$, a reduction in δ increases military compensation with a draft, and increases the likelihood a draft, relative to a volunteer military, will induce individuals to invest in human capital in the military. An increase in z also increases military compensation with a draft.

In sum, a larger wage differential between those who have and those who have not invested in human capital, a shorter length of additional time required for military service for those who invest in human capital in the military, lower disutility from military service, and less of a difference in military pay with a draft and with a volunteer military all suggest a greater likelihood a draft will induce more human capital investment in the military than would a volunteer military.

3. Deferments

Heretofore, the possibility of one obtaining a deferment to avoid being drafted has not been considered. Deferments may be costless to an individual, say, if a deferment may obtained by enrolling in school when one would have enrolled even without a draft. However, consider the possibility investing in human capital as a civilian is not sufficient to get a deferment, possibly because educational deferments are not available.[9] Now a cost D must be incurred to get a deferment, with D assumed to be identical for all. Again, only h varies among individuals. From before, if one does not obtain a deferment, is drafted, and then invests in human capital in the military, lifetime compensation is $[z\omega + (z - 1)\delta]l_3 + W_S[1 - l_3]$. Avoiding service and investing as a civilian yields compensation of $W_S - h - D$. Thus, one will choose to not defer, be drafted, and invest in the military if:

$$l_3[W_S - z\omega - (z - 1)\delta] - D \equiv h_a < h. \tag{5}$$

If $h_a < h_v$, we are more likely to have investment in the military with a draft (when deferments are possible) than with a volunteer military. Using *ineqs*.(1) and (5), this requires:

$$l_3(\omega + \delta)(1 - z) < D. \tag{6}$$

The LHS of *ineq*.(6) is the difference in earnings with the draft versus a volunteer military for one who invests in human capital in the military. One loses less by prolonging military service with a draft because of lower earnings. Only if this difference in military earnings with a draft is less than the cost of a deferment is it more likely---with deferments---for there to be more investment in human capital in the military with a draft than with a volunteer military.

[9] Deferments are analyzed in detail in Perri (2010).

Thus, with deferments, if investment in human capital as a civilian is sufficient for a deferment---$D = 0$---then a draft will not yield more investment in human capital in the military than will a volunteer military. The impact of l_3, ω, δ, and z on the likelihood a draft induces more human capital investment in the military than does a volunteer military is the same as when deferments do not exist. Without deferments, the alternative to investing in the military is to invest as a civilian after spending l_1 in the military. With deferments, l_1 has no impact on the likelihood the draft will induce more investment in human capital in the military since the alternative to investing in the military is to obtain a deferment and invest in human capital as a civilian.[10]

4. Summary

The decision to invest in human capital while in the military or as a civilian is different if one has been drafted than it is with a volunteer military (or with deferments), when one can avoid military service and invest in human capital, earning a higher wage for a longer period of time. We have considered the belief of the Israeli Defense Forces' general staff that fewer individuals would be recruited in their computer corps with a volunteer military. This concern should also apply to the U.S. military which increasingly requires computer skills. Because a draftee has a lower return from investing in human capital as a civilian---due to reduced civilian work life---there are situations where more human capital investment in the military *would* occur with a draft than with a volunteer military. However, if the cost of obtaining a deferment is low enough, a draft will not result in increased investment in human capital in the military.

Educational subsidies have been a part of military compensation in the U.S. since the G.I. Bill at the end of World War Two. In the model herein, an educational subsidy implies h is reduced. The likelihood more human capital investment in the military will occur with a draft versus a volunteer military is not affected by a change in h. Although educational subsidies may improve recruitment, a lower h implies less investment in human capital in the military with either a volunteer military or a draft. Thus, unless individuals who invest in the military might invest in additional human capital post-military, or such subsidies induce enlistment of more high quality individuals who then are able to invest in human capital when others are not capable of doing so (possibilities ignored in the model herein), educational subsidies have a negative effect on human capital investment in the military.

We have only considered the amount of human capital investment in the military. We have not considered the welfare effects of such investment. For example, it may be a volunteer military leads to higher welfare than with a draft, but would require higher compensation for skilled military personnel in order to induce more to enlist and invest while in the military. We leave welfare analysis for the future.

[10] As mentioned previously, in the Appendix, it is shown never investing is likely dominated by investing in the military if drafted, so the relevant choices are 1) to allow oneself to be drafted, and then invest, and 2) to defer and invest as a civilian.

Appendix

Proof investing in human capital in the military is likely to be preferred to never investing (ineq.(2) holds).

For z sufficiently large, *ineq*.(2), henceforth called *I2*, holds. If $z = 1$, *I2* becomes $W_S > \omega$. The LHS of *I2* is increasing in W_S and decreasing in δ. Thus, with $W_S > \omega$, suppose $\delta \to \omega$ (disutility of the military is so high it equals the civilian wage), and $W_S = k\omega$, $k > 1$. Thus, we have reduced the likelihood *I2* holds. We now have *I2* holding if:

$$z > \frac{1}{2}\left(\frac{1-2l_1+l_3-k[1-l_3]}{l_3-l_1}\right) = \hat{z}. \qquad (7)$$

Now $\frac{\partial \hat{z}}{\partial l_3} = \{+\}(k-1)(1-l_1) > 0$, so a larger l_3, given l_1, makes *I2* less likely to hold. In the Israeli military, $l_3 = 2l_1$ (serve 6 years in the IT corps, Mamram, versus 3 years as a simple draftee). If $l_3 = 2l_1$, we have

$$\hat{z} = \frac{1}{2}\left(\frac{1-k[1-2l_1]}{l_1}\right). \qquad (8)$$

Now, with $l_3 = 2l_1$, $\frac{\partial \hat{z}}{\partial l_1} = \{+\}(k-1) > 0$

With $\hat{z}$ positively related to l_1, if $l_1 = .075$ (draftees serve 3 years [as in the Israeli Defense Forces] out of a 40 year lifetime in the work force, which is high for the U.S. where draftees served 2 years), we have

$$\hat{z} = \frac{1}{2}\left(\frac{1-.85k}{.075}\right). \qquad (9)$$

Note $W_S = k\omega$, volunteer pay = $\omega + \delta = 2\omega$ since $\delta = \omega$ in this example. Thus the ratio of wages of trained workers to volunteers in the military is $W_S/2\omega$. If $k > 1.176$, $\hat{z} < 0$ and *I2* holds with certainty. This requires $W_S/2\omega = k/2$ be at least .578, or trained workers earn at least 58% of what volunteers would earn in order for investing in the military with a draft to be preferred to never investing. ■

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