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Appendix of

“A Mercenary Army of the Poor: Technological change and the demographic composition of the post-9/11 U.S. military,” *Journal of Strategic Studies* (forthcoming).

Appendix A: The Hazard of Geographic Data

The reason our results differ from previous studies and one contributing factor to the conflicting conclusions reached by the previous literature is the nature of the data used. We relied on individual-level data, while many previous studies have used the average characteristics of the zip code of origin of the individual as proxy. In this section we explore this aspect more in depth and discuss how the geographic data might lead to misleading conclusions.

The most important issue with geographic data is the non-linear relationship between military recruitment and income levels we have showcased above. Some geographic data presents the same pattern: The National Priorities Project (2011) reports the average income level of recruits' zip codes in 2005-2010 by deciles. The pattern is shown in Table A1. The relationship between the average income level of the recruits' neighborhood and probability of joining the military is a reversed-U shape. The poorest and richest zip codes are both under-represented, while zip codes with average levels of income are over-represented. This pattern is similar to the individual-level data found in this study. However, if one were to incorrectly assume that the relationship between income and recruitment is linear, the National Priorities Project data would produce a weakly negative correlation between income and the probability of joining the military.

Table A1: Recruitment Probability and Income

	Income Decile of Zip code	Recruitment Probability
Poorest	I	7.0%
	II	10.2%
	III	10.9%
	IV	10.9%
	V	11.9%
	VI	11.5%
	VII	11.3%
	VIII	10.3%
	IX	9.3%
	Richest	X

Notes: [1] Average over 2005-2012.

Appendix B

In order to reassure about the strength of our results, we have conducted two additional tests, one concerning interest in joining the U.S. military and one about life satisfaction. The ASVAB test mentioned in the manuscript included one question about the interest in joining the military in the future: “How likely are you to join the military in the future?” This question strongly predicts the probability of joining the military. 12 percent of those who answered “likely” or “very likely” joined, compared to merely 3 percent of those who answered “unlikely” or “very unlikely”. Interestingly, while respondents who showed interest in joining the military tend to come from lower than average income households, consistently with the “demand side” theory of military recruitment, on average recruits who were interested in joining the military but did not enlist, scored poorly on the ASVAB

skill test. While not definitive proof, this suggests that screening for skills may be an explanation for the under-representation of low-income recruits as we hypothesized.

Second, we looked at military personnel's life satisfaction. Table B1 is identical to table 1 from the manuscript, but has one additional line, about life satisfaction. Logically, if the conventional wisdom is correct, military personnel should have a lower life satisfaction than the general population, since poverty and poorer job prospects should be drawing them into the military. Additionally, since the problem of the poor joining the military has allegedly widened over the past decades (according to Kriner and Shen 2010), life satisfaction among military personnel should have worsened in this period. Working on the data from the 1979 NLSY, Fredland and Little (1982) found that those who served had lower job satisfaction than civilians. We conducted the same test on data from 2006 and 2008 and we found that, in contrast to the dominant consensus, those who joined the military tend to have higher than average self-reported life satisfaction. The average difference is 0.13 standard deviations, which is statistically significant. This data does not permit to assess whether life satisfaction has an effect on joining the armed forces, since the question about life satisfaction was not present in the original survey and was added only later on (in 2006 and in 2008). Yet, we believe this data provides additional ancillary evidence in support of our hypothesis and against the conventional wisdom (e.g., Massing 2012).

Table A1: General Characteristics of veterans and civilians, by gender

	Male		Female	
	Veterans	Civilians	Veterans	Civilians
Median Income	\$70,526	\$63,844	\$73,495	\$63,844
Average Income	\$79,257	\$78,142	\$82,034	\$77,076
Median Wealth	\$91,314	\$77,949	\$55,678	\$74,980
Average Wealth	\$149,241	\$169,146	\$137,625	\$159,781
Cognitive Skills	102	99	103	101
% Whites	68.8%	66.0%	54.6%	67.3%
% Hispanics	13.6%	13.1%	15.6%	11.8%
% Afr. Americans	13.4%	15.9%	23.5%	15.6%
Education (years)	14.0	13.5	14.8	14.2
Parental Education (years)	12.9	12.9	12.9	12.8
Life Satisfaction	7.8	7.6	8.1	7.7

Notes:

[1] Income and wealth are family income and wealth reported in 1997 (in 2013 dollars).

[2] Cognitive skills as measured by an AFQT-like score (normalized to 100).

[3] Education is measured as the average number of years of education in 2013.

[4] Life Satisfaction is an index collected in 2006 and 2008. It ranges between 1 (Extremely Dissatisfied) and 10 (Extremely Satisfied).

Appendix C: The Case of Special Operation Forces

As a side test, it is also worth looking into the U.S. Special Operation Forces (SOF). This case is substantially important for three main reasons. First, SOFs are elite units employed in high-risk operations. Thus, they are particularly suited for testing the argument that the poor and disadvantaged are more likely to enlist and then to be assigned to combat roles against the thesis that with the change in warfare, the U.S. military has come to demand more capable individuals in terms of physical, cognitive and non-cognitive skills. Second, the US military – and in particular the U.S. Army and the U.S. Marine Corps – has fundamentally transformed, in recent years, at least in part towards the SOF-model and thus into highly trained, agile and rapidly deployable forces able to conduct a plurality of missions (Farrell et al. 2013). Thus, the U.S. SOFs may likely represent a useful

case to understand the evolution of the U.S. armed forces in the future (Fine 1998). Third, not only the size of US SOFs but also the intensity and extension of their employment have grown dramatically since the 9/11 attacks (Jackson and Long, 2009). Thus, in the future, according to many, U.S. military operations will increasingly resemble current SOF missions (Andres et al. 2005/06).

A brief glance at the composition of the U.S. Special Forces strongly questions the conventional wisdom. Minorities are in fact highly underrepresented within U.S. Special Operations (Kosiak, 2008) and the reasons are consistent with our argument. Specifically, a 1998 RAND Corporation investigation noted that minorities are under-represented in the SOF community because, on the one hand, of low ASVAB scores and incapacity to meet swimming and land navigation requirements and, on the other, because “lack of interest in SOF arising from minority preferences for occupations with less risk or greater civilian transferability” (Harrell et al. 1999: xv). Consistent with our argument, according to a work from Fred Mael for the United States Army Research Institute for the Behavioral and Social Sciences (cited in Harrell et al. 1999), swimming requirements represented a barrier for minorities because they do not have the financial resources to gain access to pools or swimming lessons (p. 75). In fact, officers (more educated and from higher socio-economic strata) were able to learn to meet such requirements (p. 76). These considerations are consistent with the view that SOFs represent the other side of the coin of the Revolution in Military Affairs that has changed the American way of war: as the U.S. has become more capital-intensive, it has also come to rely more extensively on highly-trained elite corps (Lindsay 2013).

Appendix D – Effect of 9/11

About 75% of the young men and women in our sample were 18 years of age or older on September 2001. This suggests that, at least as a work hypothesis, the enlistment patterns discussed in the article

could be driven by the aftermath of the 9/11 terrorist attacks, rather than the technological and tactical changes we suggested. Those extraordinary and unprecedented events arguably caused a surge of patriotism across the country and might have inspired countless middle-class teenagers to join the military.¹ If this were the case, our results would not be representative of a more general change in enlistment patterns, but rather reflect special circumstances in the history of the United States.

The results presented in this section suggest that the terrorist attacks did not have a substantial effect on enlistment rates, and do not drive our results. Figure 11 below shows the distribution (and cumulative distribution) of the year in which people in our sample joined the military. The figure shows that approximately 40% of the sample joined the military in or before 2001. In other words, almost half of those who joined the military did so before the terrorist attacks, and by definition their choice was not affected by the attacks themselves. However, this also means that 60% of the people that enlisted in our sample might have been affected by those events. Indeed, 2002 and 2003 are the years in which most people chose to enlist (followed by 2001, 2000, and 1999).²

¹ E.g., Leonie Huddy and Stanley Feldman, “Americans respond politically to 9/11: Understanding the impact of the terrorist attacks and their aftermath,” *American Psychologist* Vol. 66, N. 6 (September 2001), pp. 455-467.

² This figure also clarifies that a similar concern having to do with the financial crisis in 2008, namely that the financial and economic crash caused many individuals to join the military, is misplaced. More than 90% of the people had already joined the military by 2008. Evidently their decision was not driven by the economic upheaval of 2008 and the following years.

Figure D.1

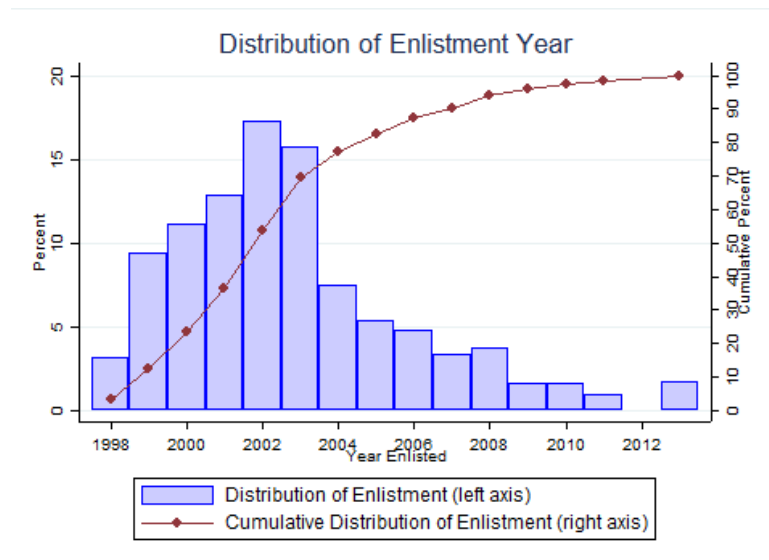
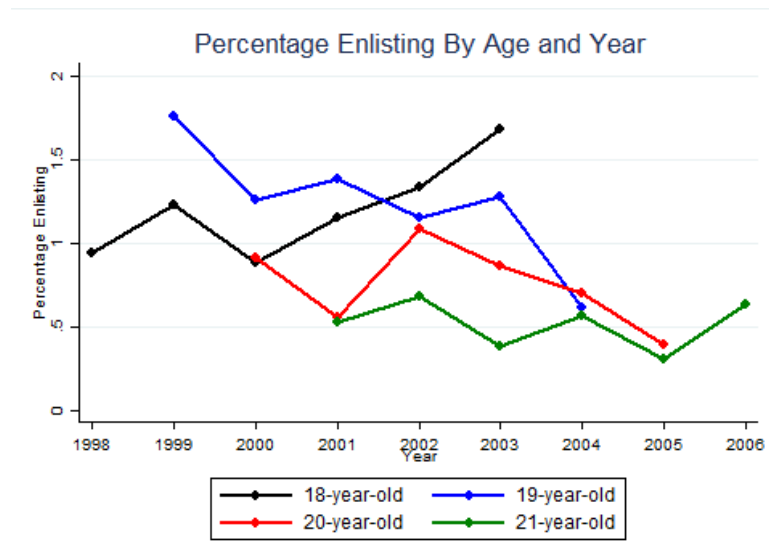


Figure 11, however, is missing one important determinant of the enlistment decision: age. In 1998 only 35% of the sample was 17 or older, and hence able to enlist. In 2000 instead 75% of the sample was 17 or older, and hence able to enlist. In other words, as people in the sample get older we would naturally expect an increase in the number of people enlisting. For this reason, Figure 12 separates the effect of age from the effect of the terrorist attacks. We plot the enlistment rate (the share of people who joined the military over the number of people that could have joined the military) for each age group in each year. For example, we consider all people who were 19 year old in 2000 and calculate the percentage that enlisted in the same year. Similarly, we look at all the people who were 19 year old in 2002 and calculate the percentage that enlisted in the same year. If 9/11, and the surge in patriotism associated with it, caused people to join the military at a higher rate we would expect the enlistment rate in 2002 to be higher than in 2000.

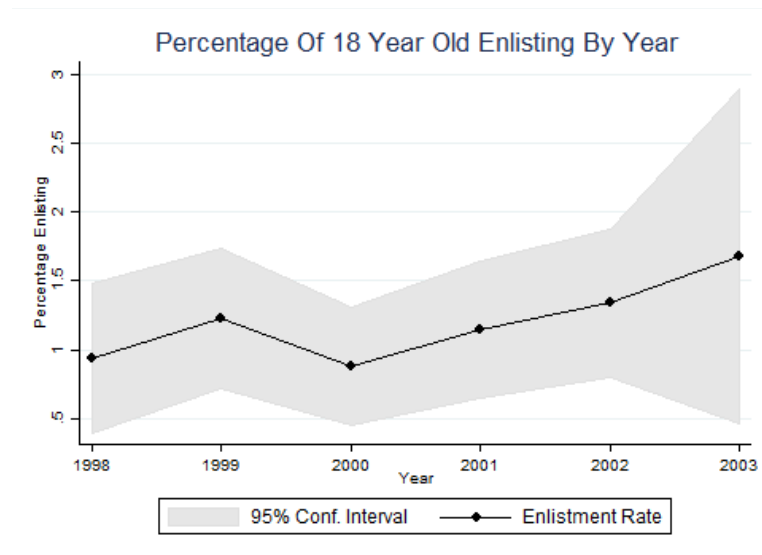
Figure D.2



Let's ignore for a moment the line associated with 18 years of age. Figure 12 shows two things: first, age matters. 19 year olds are the group that is most likely to join the military in all years, followed by 20 and then 21 year olds. Moreover, the enlistment rate for all groups appears to be decreasing or flat over time. We do not observe an increase in the enlistment rate after 2001 for no age group except for the 18 year old. 18 years old are the only group whose enlistment rate appears to be increasing over time, especially after 2001. This result however is not statistically significant: Figure 13 shows the 18 year old enlistment rate over time and the 95% confidence interval.³

³ Note that if we were to include the 95% confidence interval for all age groups we would conclude that many of the patterns we see are not statistically significant, hence we cannot establish with statistical certainty that the enlistment rates by age varied at all during the time period considered.

Figure D.3



On the one hand, the 18 year old individuals show a pattern that is at least consistent with a 9/11 effect; on the other hand this patter does not seem to be statistically significant. However, as a final check we have excluded the 18 year old cohort and re-run our regressions. As shown in Table 4, our results are qualitatively unchanged after excluding the 18 year old.

Table D.1: Marginal Effects from Logit Regression without recruits who joined when 18 y old

Variables	(1)	(2)	(3)	(4)	(5)	(7)	(8)
Male	0.0540** (0.00466)	0.0528** (0.00514)	0.0549** (0.00560)	0.0527** (0.00611)	0.0520** (0.00601)	0.0472** (0.00593)	0.0494** (0.00609)
AfricanAm	-0.00552 (0.00436)	0.00606 (0.00617)	0.000528 (0.00633)	0.0127 (0.00834)	0.0138 ⁺ (0.00830)	0.0112 (0.00815)	0.0102 (0.00822)
Hispanic	0.00495 (0.00529)	0.0144* (0.00698)	0.0123 (0.00773)	0.0183* (0.00903)	0.0191* (0.00902)	0.0192* (0.00895)	0.0211* (0.00954)
South	0.00887* (0.00434)	0.00917 ⁺ (0.00470)	0.00766 (0.00509)	0.00819 (0.00545)	0.00834 (0.00539)	0.0104 ⁺ (0.00536)	0.0114* (0.00556)
IQ		0.112** (0.0201)		0.116** (0.0249)	0.107** (0.0249)	0.104** (0.0242)	0.100** (0.0244)
IQ^2		-0.00533** (0.000989)		-0.00551** (0.00122)	-0.00472** (0.00130)	-0.00472** (0.00126)	-0.00460** (0.00128)
ParentalInc97			0.00297 ⁺ (0.00163)	0.00211 (0.00173)	0.0110* (0.00519)	0.00986 ⁺ (0.00518)	0.0123* (0.00541)
ParentInc97^2			-9.09e-05 (8.09e-05)	-6.67e-05 (8.43e-05)	-2.68e-05 (8.37e-05)	-3.89e-05 (8.24e-05)	3.35e-05 (8.91e-05)
Income*Skill					-0.00094 ⁺ (0.00052)	-0.000845 (0.000521)	-0.000625 (0.000562)
Rural						-0.00744 (0.00500)	-0.00815 (0.00507)
Obese						-0.0207** (0.00558)	-0.0209** (0.00563)
Health						-0.00875* (0.00362)	-0.00813* (0.00368)
Born in US						0.0136 ⁺ (0.00787)	0.0110 (0.00892)
Parental educ							0.00280 (0.00207)
Parental Edu*Income							-0.000442 ⁺ (0.000229)
Observations	8,852	6,940	6,350	5,150	5,150	4,894	4,731

Robust standard errors in parentheses. ⁺ significant at 10%; * significant at 5%; ** significant at 1%.

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