

2009 Annual Meeting
Population Association of America

1st Choice: Session 707
Military Service, Work, and the Life Course

2nd Choice: Session 1103
Impact of Demographic Change on Organizations

Demographic change: A security risk for Germany?

Projection of the quantitative and qualitative military manpower supply in the year 2030

Wenke Apt *

Max Planck Institute for Demographic Research

Abstract

With demographic aging, the German military faces severe recruitment challenges due to an overlap of civilian and military manpower demand, and increased job requirements for soldiers. The objective of the present study is to estimate the quantitative and qualitative military manpower supply in the year 2030. The underlying theoretical perspective is multifaceted; it draws upon the economic framework of military manpower supply and demand, standard occupational choice and random utility theory. Based on data from federal statistics, surveys and the German Department of Defense, preliminary results suggest a significant negative relationship between educational attainment and both enlistment propensity and actual enlistment. The odds of military propensity and actual enlistment are lower for females; they also decrease with age. Youths from economically weaker regions have high odds of considering a military career and enlisting. These results indicate various recruitment challenges and a potential gap between qualitative manpower supply and demand.

* Ph.D. Student
Max Planck Institute for Demographic Research
Konrad-Zuse-Straße 1, 18057 Rostock, Germany
Tel.: +49-381-2081-220 Fax: +49-381-2081-520
Email: apt@demogr.mpg.de

Description of the topic: Demographic change as a military recruitment obstacle

It is well-established that the aging of the baby boomer generation will lead to a quantitative manpower shortage in the near future (e.g. Börsch-Supan 2002; McMorrow and Roeger 2004; Prskawetz, Lindh et al. 2006). In the European Union, the share of the working-age population will plummet from 2012 (Carone, Costello et al. 2005). Since businesses will be confronted with scarce labor supply, the competition for young and qualified labor may become fiercer. In this context, the private industry may be better able to launch attractive recruitment incentives and pay competitive wages than the public sector (Warner and Asch 1995; Orvis and Asch 2001). The military, the biggest public employer in Germany, will be faced with even more severe recruitment constraints: (1) the threat to life or physical condition alienates suitable candidates; (2) the recruitment focus rests upon young and physically fit labor, while evidence suggests a declining physical condition of adolescents; (3) legislation restricts recruitment to German-born or naturalized citizens; and (4) the recruitment potential in the economically weaker Eastern Germany will be reduced substantially as a result of the sweeping decline of fertility after reunification (Kümmel 2006; Sandell 2006).

This reduced supply of military manpower – both in terms of quantity and quality – coincides with far-reaching changes in the post-Cold War security environment that entail a transformation of war with new kinds of security risks, new actors, an asymmetry of resources and tactics, and a heavy reliance on technology (Handel 1981; Binkin 1986; Weiner and Teitelbaum 2001; Cincotta, Engelman et al. 2003; Kaldor 2007; von Bredow 2007). The changed character of military tasks, the rise in military missions other than war, and the increased frequency of military deployments alter the personnel needs of the military (Cote 2004; Haltiner and Klein 2005; Williams and Gilroy 2006). Contemporary militaries emphasize the recruitment of “high quality” youth, thereby referring to the level of educational attainment and other individual characteristics like mental strength, job aptitude, physical vigor, motivation, adaptability to change, cooperativeness, and technical skills (Dandeker 1995; Caforio 2003; Cohn 2007). However, the exact same qualities are demanded by civilian employers. In sum, the central obstacles to military recruitment and the regeneration of the armed forces lie in: (1) the overlap of the civilian and military manpower demand, and (2) higher qualitative manpower requirements (Lunn 1991; Sandell 2006). Ultimately, this dilemma leads to the question of whether demographic change will curtail Germany’s future security policy choices and if so, what policy levers exist to mitigate the impact.

The present study outlines a projection of potential manpower supply for the German military until 2030. The projection makes use of a body of different data sources. It draws upon trends in health and education over time and cohort, and includes logistic regression estimates about enlistment propensity and actual enlistments as a basis to estimate the future recruitment potential. Projection variants will be based on scenarios about future trends in health, education and preferences among youths. The comparison between future manpower supply and the actual demand stated by the German Department of Defense will help to design future recruitment incentives and adjust internal personnel policies to reduce the necessary external manpower inflows.

Theoretical framework

The present study adopts a multifaceted theoretical approach. As a foundation, it draws upon the economic framework of military manpower supply and demand (Hartley and Sandler 1995). Standard occupational choice theory is considered, which differentiates between two sectors in an economy: the military and the civilian sector (Rosen 1986).

Based on their personal characteristics and choice processes, individuals decide upon employment in one sector or the other.

In this regard, human capital endowments have been found to determine individual opportunities in the labor market and occupational preferences. Individual health status and educational attainment are defined as dimensions of human capital that influence labor productivity (Becker 1962; Grossman 1972). Occupational preferences are commonly attributed to the interplay of economic, social, educational and psychological factors. Previous studies have linked youth’s initial interest in joining the military to a range of key determinants in the micro and macro environment, such as individual tastes, youth labor market conditions, family background, views of society and attitudes of key influencers (e.g. Murray and McDonald 1996; Orvis, Sastry et al. 1996; Bachman, Segal et al. 1998; Kilburn and Klerman 2000; Orvis and Asch 2001).

Accordingly, military enlistment has been described as a “two-party decision” (Bachman, Segal et al. 2000) in that the military defines a range of entry requirements with respect to educational attainment, as well as cognitive and physical abilities that the soldier applicant has to fulfill. Meanwhile the potential enlistee must perceive the soldier profession as superior to other civilian occupations. In line with random utility theory and the lifecycle perspective established by Mincer (1958) and Becker (1962; 1964), individuals will aim for a sequence of schooling, training and professions that will maximize their expected welfare or utility over the life course. They will opt for that profession that yields the highest expected utility (Kilburn and Klerman 2000).

Within this theoretical framework, the present study adopts the approach that the total size of the German male population at recruitment age is reduced according to four exclusion criteria that pertain to human capital traits relevant for military service (see figure 1).[†] These include inadequate health and physical fitness status, inadequate level of educational attainment and aptitude test results, preference for a civilian occupation, and lack of German citizenship. Individuals that fall into one of these categories drop out of the eligible recruitment population. The remaining military recruitment potential includes those young males that fulfill all minimal recruitment requirements.

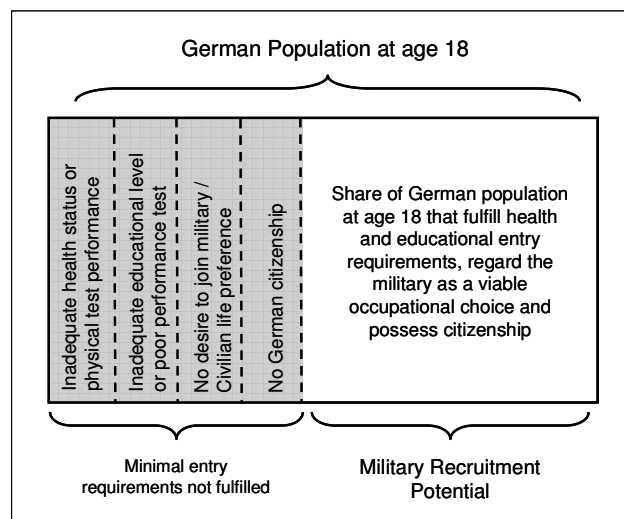


Figure 1: Theoretical framework

[†] The analysis focuses on estimating the recruitment potential among males. Only 6.5% of all German shorter- and longer-service volunteers and professional soldiers are currently females (Biehl et al. 2007).

While most studies about enlistment supply treat manpower demand as implicitly exogenous (DeBoer and Brorsen 1989), the present study also gives consideration to internal personnel management levers that may alter the required manpower inflow to sustain the force. By understanding and influencing the behavioral pattern of its employees with incentives, the military could use manpower planning to steer long-term levels of required recruitment, retention, wastage and mix of skills (Edwards and Silver 1983).

Data and research methods

The projection draws upon a large body of data sources (see table 1), which allows for time and cohort analyses of health status and educational attainment; as well as logistic regressions to analyze the predictors of enlistment propensity and actual enlistments in the German military.

Data Input	Duration	Source
Base projection		
11th coordinated population projection	2005-2050	Federal Statistical Office
Health		
Body Mass Index (soldiers, non-soldiers)	1998, 2003, 2005	Microcensus
Smoking prevalence (soldiers, non-soldiers)	1998, 2003, 2005	Microcensus
Overweight / Exercise habits (N=7.800; 12-23 yrs)	2004-2006	Leyk (2007)
Degree of fitness of soldier applicants	1998-2007	German Department of Defense
Physical fitness test performance of soldier applicants (N=58.000 applicants; 17-26 yrs)	1998-2007	German Department of Defense Levk (2006)
Education		
Educational attainment (soldiers, non-soldiers)	1998-2007	Microcensus
Regional "Intelligence score" (based upon test performance of 248.727 male soldier applicants (18-22 years))	1992, 1998	Ebenrett (1999, 2003), Eber & Schambach (2007)
Projection of number of graduates acc. to qualification	2005-2020	Ministry of Education and Arts
Youth preferences		
Youth opinion survey (N=2.000)	2004, 2006	Bundeswehr Academy for Information and Communication
Share of conscientious objectors	1999-2008	Federal Office of Civilian Service
Citizenship		
	1970-2007	Federal Statistical Office

Table 1: Overview of data sources

The findings from these initial analyses serve as the basis for optimistic, baseline, and pessimistic scenarios about future trends in health, education and preferences among youths, which will be applied to the size of the male youth population in 2030 as published in the 11th Coordinated Population Projection.

Additional data on manpower stocks, flows and the underlying transition probabilities in the German military come from the German Department of Defense. For example, annual information about the initial and end inventory, accessions, promotions, separations, or the gap between actual figures and goal variables from 1998 to 2007 provide the basis for understanding behavioral patterns of the military personnel.

Preliminary results

The focus of the empirical analysis rests on the predictors of enlistment supply as described in the theoretical framework. First exemplary results on the propensity to enlist and actual entry of adolescents into basic military service are as follows:

Logistic regressions on enlistment propensity show that youths with lower secondary education have significantly higher odds of considering a military career than those with higher educational attainment. Women are significantly less likely to exhibit an interest in joining the military. Within the surveyed age group of 16-20 year-olds, the odds of considering the soldier profession decrease with age, most likely because older youths have already decided upon their future occupational pathways. Youths in Eastern Germany display higher interest in becoming soldiers. A possible explanation is that the prevailing economic conditions affect an individual's inclination for a military career. This is also supported by the fact that a GDP dummy variable partly picks up the East-West gradient in enlistment propensity. For similar economic reasons, youths from smaller urban settlements have relatively higher odds of regarding the soldier profession as a viable occupational option.

The described results on enlistment propensity nicely match logistic regressions on actual enlistments in the German military based on the German Microcensus. For example, these estimates suggest a significant negative relationship between educational attainment and actual entry into basic military service. Again, youths from economically weaker regions like Northern or Eastern Germany have comparatively higher odds of enlisting in basic military service, and the same is true for youths from smaller urban settlements.

As a preliminary conclusion, these results point to a variety recruitment challenges for the German military and a potential gap between qualitative manpower supply and demand: (1) In view of the higher enlistment propensity and actual enlistment rates among East German adolescents, the low post-reunification birth rates and the shrinking of the local youth cohorts will have an excessive impact on military recruitment. (2) The pronounced interest of less educated youths in a military career may conflict with the increasing qualitative requirements for soldiers. (3) A quantity reduction of people eligible for enlistment may lead to quality tradeoffs; i.e. in order to fulfill the ranks, the German military may need to lower intellectual and physical entry requirements and offer in-service training. (4) In order to avoid jeopardizing personnel quality and military effectiveness, the German military might need to promote diversity and turn recruitment incentives towards non-traditional target groups. This will require changes with regard to the institutional setup and self-image but will allow the German military to enhance performance and improve civil-military relations despite demographic aging.

References

- Bachman, J. G., D. R. Segal, et al. (1998). Military Propensity and Enlistment: Cross-Sectional and Panel Analyses of Correlates and Predictors. Monitoring the Future Occasional Paper 41. Ann Arbor (Michigan), Michigan Univ.: 233.
- Bachman, J. G., D. R. Segal, et al. (2000). "Who Chooses Military Service? Correlates of Propensity and Enlistment in the U.S. Armed Forces." Military Psychology **12**(1): 1 - 30.
- Becker, G. S. (1962). "Investment in Human Capital: A Theoretical Analysis." The Journal of Political Economy **70**(5): 9-49.
- Becker, G. S. (1964). Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education. New York and London, National Bureau of Economic Research.
- Binkin, M. (1986). Implications for Manpower Requirements. Military Technology and Defense Manpower. Washington, D.C., The Brookings Institution.
- Börsch-Supan, A. (2002). Labor market effects of population aging. MEA discussion paper series, Mannheim Research Institute for the Economics of Aging, University of Mannheim.
- Caforio, G. (2003). The Professional Soldier. Armed Forces and International Society. J. Callaghan and F. Kernic, LIT Verlag, Münster: 165-170.
- Carone, G., D. Costello, et al. (2005). The economic impact of ageing populations in the EU25 Member States. EUROPEAN ECONOMY. ECONOMIC PAPERS. No. 236. Brussels, European Commission.
- Cincotta, R., R. Engelman, et al. (2003). The security demographic: Population and civil conflict after the cold war. Washington, D.C., Population Action International.
- Cohn, L. (2007). Who will Serve? Education, Labor Markets, and Military Personnel Policy. Durham, N.C. , Department of Political Science, Duke University: 403.
- Cote, O. R. (2004). The Personnel Needs of the Future Force. Filling the Ranks: Transforming the U.S. Military Personnel System. C. Williams. Cambridge, MA, Belfer Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University: 361.
- Dandeker, C. (1995). "Flexible forces for a post cold war world: a view from the United Kingdom." The Tocqueville Review **XVII**(1): 23-38.
- DeBoer, L. and B. W. Brorsen (1989). "The Demand for and Supply of Military Labor." Southern Economic Journal **55**(4): 853-869.
- Ebenrett, H. J., D. Hansen, et al. (2003). "Verlust von Humankapital in Regionen mit hoher Arbeitslosigkeit." Aus Politik und Zeitgeschichte B 6 - 7/2003: 25-31.
- Ebenrett, H.-J. and K. J. Puzicha (1999). EUF-Testleistungen wehrpflichtiger junger Männer im wiedervereinigten Deutschland Regionale Unterschiede bei Intelligenzleistungen und den Basisfertigkeiten Rechnen und Rechtschreibung. SOWI-Arbeitspapier Nr. 122. Strausberg, Sozialwissenschaftliches Institut der Bundeswehr.
- Eber, S. and S. Schambach (2007). "Brain drain" in deutschen Regionen: Effekte von Arbeitslosigkeit und innerdeutscher Migration. Untersuchungen des Psychologischen Dienstes der Bundeswehr 2007. Bundesministerium der Verteidigung (PSZ III 6). Bonn: 9-50.
- Edwards, J. and M. Silver (1983). Introduction – the Art of Designing a Manpower Strategy. Manpower planning – Strategy and Techniques in an Organizational Context. J. Edwards, C. Leek, R. Loveridge et al, Wiley and Sons Ltd: 1-7.
- Grossman, M. (1972). "On the Concept of Health Capital and the Demand for Health." Journal of Political Economy **80**: 223-255.

- Haltiner, K. W. and P. Klein (2005). The European Post-Cold War Military Reforms and Their Impact on Civil-Military Relations. The European Armed Forces in Transition: A Comparative Analysis. F. Kernic, P. Klein and K. Haltiner. Frankfurt am Main, Europäischer Verlag der Wissenschaften: 9-30.
- Handel, M. (1981). "Numbers do count: The question of quality versus quantity." Journal of Strategic Studies 4(3): 225-260.
- Hartley, K. and T. Sandler (1995). Military Manpower. The Economics of Defense. Melbourne, Cambridge University Press: 157-176.
- Kaldor, M. (2007). New and Old Wars. Stanford, CA, Stanford University Press.
- Kilburn, R. and J. A. Klerman (2000). Enlistment Decisions in the 1990s: Evidence From Individual-Level Data. Santa Monica, RAND Corporation 100.
- Kümmel, G. (2006). An All-Volunteer Force in Disguise: On the Transformation of the Armed Forces in Germany. Service to Country: Personnel Policy and the Transformation of Western Militaries. C. L. Gilroy and C. Williams. Cambridge, MA, The MIT Press 203-229.
- Leyk, D., U. Rohde, et al. (2006). "Physical Performance, Body Weight and BMI of Young Adults in Germany 2000-2004: Results of the Physical-Fitness-Test Study." International Journal of Sports Medicine 27: 642-647.
- Leyk, D., U. Rohde, et al. (2007). "Erste Ergebnisse der Studie Fit-fürs-Leben: Übergewicht und Bewegungsmangel bei Heranwachsenden und jungen Erwachsenen " Wehrmed. Mschr. 51(5-6/2007): 143-147.
- Lunn, S. (1991). Military Personnel Policies and Alliance Security. Population Change and European Security. L. Freedman and J. Saunders. Oxford, Brassey's (UK): 205-217.
- McMorrow, K. and W. Roeger (2004). The Economic and Financial Market Consequences of Global Aging. Berlin, Heidelberg, Springer.
- Mincer, J. (1958). "Investment in Human Capital and Personal Income Distribution." The Journal of Political Economy 66(4): 281-302.
- Murray, M. P. and L. L. McDonald (1996). Recent Recruiting Trends and Their Implications for Models of Enlistment Supply. R. Corporation. Santa Monica, CA 83.
- Orvis, B. R. and B. J. Asch (2001). Military Recruiting - Trends, Outlook and Implications. Santa Monica, CA, RAND Corporation: 1-57.
- Orvis, B. R., N. Sastry, et al. (1996). Military Recruiting Outlook: Recent Trends in Enlistment Propensity and Conversion of Potential Enlisted Supply. R. Corporation. Santa Monica, CA: 80.
- Prskawetz, A., T. Lindh, et al. (2006). The Relationship Between Demographic Change and Economic Growth in the EU. Report for Tender VT/2005/35. A. Prskawetz and T. Lindh.
- Rosen, S. (1986). The theory of equalizing differences. Handbook of labor economics. O. Ashenfelter and R. Layard. Amsterdam, North Holland. I: 641-692.
- Sandell, R. (2006). Coping with Demography in NATO Europe: Military Recruitment in Times of Population Decline. Service to Country - Personnel Policy and the Transformation of Western Militaries. C. L. Gilroy and C. Williams. Cambridge, M.A. , The MIT Press: 65-96.
- von Bredow, W. (2007). Conceptual insecurity: News wars, MOOTW, CRO, terrorism, and the military. Social Sciences and the Military. G. Caforio. New York, NY, Routledge: 163-180.
- Warner, J. T. and B. J. Asch (1995). The Economics of Military Manpower. Handbook of Defense Economics. K. H. T. Sandler. New York, Elsevier. 1: 345-398.

- Weiner, M. and M. Teitelbaum (2001). Political Demography, Demographic Engineering. New York, Oxford, Berghahn Books.
- Williams, C. and C. Gilroy (2006). "The Transformation of Personnel Policies." Defence Studies **6**(1): 97-121.