

9 Educational returns over the life course

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Abstract: Pillar 5 of the German National Educational Panel Study focuses on various returns to education over the life course. The longitudinal design allows us to study the complex and dynamic interaction processes when qualifications, competencies, and educational certificates are turned into economic and noneconomic returns. In this chapter, we outline the central theoretical concepts for analyzing returns to education and describe how they are implemented within the National Educational Panel Study. We discuss economic returns such as income and other labor-market-related outcomes with an emphasis on expected income as an innovative concept. Non-economic returns may come in the form of better health, increased subjective well-being, reduced crime, increased social and political participation, and changing processes of family formation. Over the life cycle, returns related to health and subjective well-being will tend to accrue from early childhood through adulthood, whereas returns related to crime and political participation will tend to set in during late adolescence. In order to identify causal relationships, it is necessary to avoid considerable bias in the estimation of returns to education. One crucial source of biased estimators is the omission of the financial restrictions faced by the parents' household. Thus, pillar 5 implements several measures to control for the economic situation of the household such as household income and wealth.

Keywords: Education · Panel study · Returns · Income · Health

Bildungsrenditen im Lebensverlauf

Zusammenfassung: Säule 5 des Nationalen Bildungspanels erfasst unterschiedliche Bildungsrenditen im Lebensverlauf. Das Längsschnittdesign ermöglicht die Untersuchung komplexer

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†We regret the sudden and untimely death of Johannes Schwarze, who deceased on 12 September 2010.

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und dynamischer Interaktionsprozesse, in deren Rahmen Qualifikationen, Kompetenzen und Bildungszertifikate in ökonomische und nichtökonomische Renditen umgewandelt werden. In diesem Kapitel werden die zentralen theoretischen Konstrukte zur Analyse von Bildungsrenditen vorgestellt und ihre Implementierung im Nationalen Bildungspanel beschrieben. Wir diskutieren ökonomische Bildungsrenditen wie Einkommen und weitere Arbeitsmarkerträge mit einem Schwerpunkt auf Einkommenserwartungen als innovatives Konzept. Der Begriff der nichtökonomischen Bildungsrenditen subsumiert verbesserte Gesundheit, höheres subjektives Wohlbefinden, geringere Kriminalitätsneigung, erhöhte soziale und politische Partizipation und Auswirkungen auf den Prozess der Familienbildung. Bildungsrenditen in Form von Gesundheit und subjektiven Wohlbefinden sind über den ganzen Lebensverlauf – vom Kindergarten bis zum Erwachsenenalter – von Bedeutung, während Bildungsrenditen in Form von Kriminalitätsneigung und politischer Partizipation erst in der späten Jugendphase verstärkt auftreten. Um Kausalbeziehungen zu identifizieren, müssen gravierende Verzerrungen bei der Schätzung von Bildungsrenditen vermieden werden. Eine Quelle verzerrter Schätzer liegt in der fehlenden Berücksichtigung finanzieller Restriktionen des elterlichen Haushalts. Daher implementiert Säule 5 diverse Konstrukte zur Kontrolle der ökonomischen Haushaltssituation wie etwa Haushaltseinkommen und Vermögen.

Schlüsselwörter: Bildung · Panelstudie · Renditen · Einkommen · Gesundheit

9.1 Theoretical concepts

The National Educational Panel Study (NEPS) will provide the first ever opportunity to gauge causal returns to different measures of education in terms of different outcomes. The pillar focuses not only on economic but also on important noneconomic returns (Schuller et al. 2004) such as health, reduced crime and deviant behavior, political and social participation, as well as subjective well-being and family formation. The importance of the different indicators of educational returns varies over the life course. Whereas monetary returns do not occur before labor market entry and further labor market mobility, returns in terms of health and subjective well-being arise during childhood. Deviant behavior as well as social and political participation tend to accrue during adolescence.

The selection of variables to be controlled when analyzing the returns to education is guided by several labor market theories. Human capital theory regards education as an investment that enhances an individual's productivity and therefore future earnings. While higher returns amortize direct and opportunity costs, individuals maximize lifetime earnings by choosing the optimal level of education (Becker 1964; Mincer 1974). Within the theoretical framework of filtering and signaling (cf. Arrow 1973; Spence 1973), information about a person's productivity is assumed to be imperfect, and educational certificates serve as a signal for a worker's productivity. Whereas costs of educational attainment depend on cognitive and noncognitive skills, individuals try to attain credentials according to expected returns.

Moreover, structural aspects have to be considered. According to job competition and vacancy chain models, positions in the labor market are not freely available to anyone with the same personal resources (Sørensen 1977). Therefore, it is not changes in individual competencies but the creation of vacancies that is the central mechanism of job mobility and income gains. When the transition from school to work is considered, differences between birth cohorts are analyzed in terms of feedback effects of educational

expansion and in terms of a destandardization of the transition process and the pathways taken (Raffe 2007). How institutional arrangements influence the different pathways and educational trajectories is an important issue. Theories of segmented labor markets are another group of structural theories that deal with mechanisms of job placement, wage differences, and wage growth.

Sociological class reproduction theory argues that educational credentials reflect advantages from family background like economic, cultural, and social capital as well as status group memberships that are used as a mechanism of intergenerational advantage transfer. The economic argument that capital markets are incomplete, and that family background is therefore important for financing and investing in children's capital is in line with social reproduction theory (Bourdieu and Boltanski 1981). Another aspect is the influence of domain-general cognitive functions such as intelligence on both educational attainment and labor market outcomes. This indicates that the observed returns on educational measures alone do not reflect the whole picture, and that it is necessary to control for former competencies (Card 1999; Harmon et al. 2003). Consideration of the personal and social background variables will yield a better understanding of the way education produces its beneficial outcomes.

Additionally, a comprehensive investigation of the causal relationships is necessary to avoid considerable bias in the estimation of the benefits of education. For example, the endogeneity bias represents a serious obstacle for estimating returns to education with respect to health outcomes: The question is whether persons are healthier due to a higher level of education, or whether more healthy persons have better access to educational resources. Non-market-returns to education are more important for earlier stages in the educational career. A further question is how far early-acquired competencies facilitate additional learning. Panel data on test scores permit a causal estimation of returns to skills and competencies as well as different educational inputs like class size, teacher education, or spending per student while including fixed effects for students and schools (Wößmann and West 2006). Well-educated individuals are expected to be inclined toward more health-conscious behavior. The NEPS data will show how far cognitive competencies and knowledge about health and medicine mediate between education and health behavior.

Education impacts on behavior in different areas such as family formation or deviant behavior because of rising opportunity costs due to educational attainment. Looking at family formation and marriage, we expect a negative relationship between women's increasing level of education and the rates of entry into marriage and motherhood, thus explaining low levels of nuptiality and fertility and increasing female labor force participation. Another outcome of increasing educational participation is the higher likelihood of educational homogamy across cohorts (Blossfeld and Timm 2003). Education also correlates with deviant behavior (Sampson and Laub 2004). More education may yield less urban poverty and inequality by increasing the return to legal work, thereby impacting on the opportunity costs of criminal activities (Lochner and Moretti 2004). Moreover, education might impact on preferences like patience and risk aversion that are expected to reduce criminal activity. Finally, political and social participation increases with more education, because specific competencies and skills are a necessary precondition for participation in social life (Dee 2004).

A final indicator of non-market-returns considered in NEPS is subjective well-being. Studies have shown that life satisfaction is a valid measure of individual well-being (Frey and Stutzer 2002). The central question here is whether education has a genuine impact on well-being. Again, the panel data can be used to shed some light on the issue of whether education is a cause or consequence of well-being.

9.2 Labor market success as a key return to education

As discussed above, classic outcomes of education are economic outcomes, particularly labor market earnings (cf. Sect. 9.2.1). Since these returns accrue principally when individuals have left the educational system and started to work in the labor market, economists are also interested in expected returns by individuals who are still in the educational system. Though income expectations are crucial in economic theory, knowledge about this is sparse that is why assumptions are restrictive (cf. Sect. 9.2.2). Whatever the case, social capital is an outstanding determinant of educational achievement (see Chap. 7, this volume). In light of incomplete capital markets, financial restrictions can be decisive for educational decision making. In order to picture families' potential to fund further education, pillar 5 captures information on household income, wealth, and student grants (cf. Sect. 9.2.3).

9.2.1 Earnings

The central labor market outcome of educational investment is income, more specifically, labor market earnings and income from self-employment. Thus, pillar 5 gathers income data from employed adolescents and adults. The appropriate income definition for Germany is monthly gross and net income from employment. Other important labor market outcomes such as labor market performance, job stability, occupational career, working time, working conditions, and limitation of the working contract are dealt with in stage 8 (see Chap. 18, this volume) and pillar 3 (see Chap. 7, this volume). Through its longitudinal approach, the NEPS extends the scope of analyses of economic returns to education. NEPS data may help us to reconsider the determinants of education in classic estimates of returns to years of education, and it promotes research on returns to school quality and acquired cognitive and noncognitive competencies.

NEPS data on educational attainment go far behind the classic measure of mere years of education. By recording the educational career and measuring competencies and skills over the whole life course, it enables an unbiased investigation of returns to education. One exemplary question with a serious political background is whether gender-specific wage differentials are created within the educational system, or whether they are caused by anticipatory behavior of women in light of job discontinuities due to childbearing and maternity leave. NEPS data will provide new insights into the causes of the gender wage gap.

The quality of the educational institutions may have a strong impact on educational achievements and thus on labor market opportunities, and this is something that varies considerably (Hanushek 2005). By linking labor market outcomes to institutional features

such as school quality and competition within the educational system, NEPS data will be able to provide evidence on different measures of education that are more policy relevant than mere years of education. An important extension of knowledge on economic returns to education will be gained from the linkage of educational measures surveyed in the childhood and adolescent years to subsequent individual labor market outcomes. Thus, a valuable feature of the NEPS dataset lies in the long run when economic returns can be assessed in terms of cognitive competencies rather than years of education. There is evidence that economic returns to cognitive competencies are higher than returns to mere quantitative measures of years of education (cf. Hanushek and Wößmann 2007) or educational credentials. Data from the United States show that with regard to labor market outcomes, the importance of cognitive competencies has risen over time (cf. Murnane et al. 1995). Even among school dropouts, there are returns to cognitive competencies (Tyler et al. 2000), and higher test scores have also been shown to be associated with higher labor force participation and lower unemployment rates (McIntosh and Vignoles 2001).

9.2.2 Income expectations

Basic economic theory assumes individuals to be more or less informed about future earning streams (conditional on different educational trajectories) when making educational decisions. Though expectations on future earnings are central to an economic analysis of schooling decisions, research on expectations itself is rare. If students' expectations of returns to education are not observed, however, inferences about the decision process can be misleading, because observed choice data may be consistent with expectations and many alternative specifications of preferences or decision rules (Manski 2004). If students with higher expected gains from schooling demand more education, and expected returns correlate with actual realized returns, we are confronted with a selection problem. That is, the observed returns of schooled people would differ from the hypothetical returns of unschooled people if they were to have enjoyed the same education (cf. Griliches 1977). As long as we do not know the underlying process of school choice, we cannot infer unbiased returns to education. Subjective data on income expectations may solve these problems and help to disentangle returns to education (cf. Manski 2004).

Dominitz and Manski (1996) calculated subjective income distributions with a computer-assisted self-administered interview. By analyzing the distribution of expected income, they were able to make inferences on uncertainty, risk behavior, and perceived income inequality. Only a few other studies have elicited income expectations in the same way (e.g., Wolter 2000). Due to limitations to the design of questionnaires, point estimates of expected income are most prevalent. For example, Betts (1996) asked undergraduates about their beliefs on the current starting and average salaries of workers in different professions conditional on achieved educational credentials. Other studies have elicited income expectations on the individual level. Most of these combined questions on the general knowledge of the income distribution with students' personal income expectations conditional on varying scenarios regarding age and educational achievement (cf. Brunello et al. 2004; Webbink and Hartog 2004), whereas others collected this information unconditionally (cf. Blau and Ferber 1991).

By comparing expected wages in several occupations with the national average income in these jobs, Betts (1996) found that knowledge about the current income distribution was far from complete. However, expectations become more realistic in the final episode of education. Wolter and Zbinden (2002) have explained differences between current actual wages and expected incomes in terms of students' own job prospects, the perception of their own academic performance, and—like Betts (1996)—duration of college attendance. Whereas students tend to slightly overestimate their expected starting salaries, they clearly overstate income growth after some years of work. According to Blau and Ferber (1991) and Wolter and Zbinden (2002), it is especially men who are prone to overestimate own future earnings. Supplementary to this, Brunello et al. (2004) found a tradeoff between the expected level of starting salaries and expected income growth. Findings concerning uncertainty as measured by expected wage dispersion are ambiguous. Compared to actual wage dispersion in Switzerland, a country in which it is relatively low, Wolter (2000) detected an even lower degree of expected wage dispersion among students. In contrast, although actual wage inequality is relatively high in the United States, Dominitz and Manski (1996) found that students additionally overestimated actual wage dispersion.

In order to gather knowledge about the formation of income expectations and its role in educational decision making, NEPS focuses on students from 9th grade up to university graduation in this research area. According to students' ability to state income expectations, they are being asked about their expectations regarding their own income and the prevailing income distribution.

9.2.3 Funding of education: Family background and publicly provided grants

A strong impact on educational achievement is ascribed to family background. On the one hand, parents' educational attainment is a crucial determinant for children's own achievements (cf. Chap. 7, this volume); on the other hand, financial restrictions—which are determined most often within the family or rather within the household context—influence educational decisions. Whereas educational decisions are made under uncertainty regarding future outcomes, people's risk perceptions are determined by restrictions on the capital market.

Since most parents fund children's education for many years, the economic situation of the household is crucial for decision making. NEPS is capturing the economic situation of a household by its disposable monthly income and its wealth assets. Disposable monthly household income describes continuous income streams predominantly used for daily expenditures. Wealth serves as an income generator, and is a crucial attribute regarding access to the capital market. Moreover, liquidated wealth is a potential source of lump sum funding. Besides funding aspects, wealth correlates with determinants of educational performance such as access to learning opportunities (e.g., private music lessons or club membership) and learning conditions (e.g., own room for homework and additional teaching material). Consequently, parents are asked about their disposable monthly household income, and, as long as they are being surveyed, at least once a wealth screener is applied. It is well known for Germany that requesting information on wealth in a panel study can have severe effects on subsequent panel attrition (Rendtel 1995). Frick and Grabka

(2005) have discussed how to ask for wealth in a sensitive way. Thus, in order to gather information on wealth at the household level, a new and comprehensive screener has been developed that minimizes the risk of panel attrition.

Moreover, policy can react to financial restrictions by implementing publicly funded grants and loans. A natural experiment (Heckman and Smith 1993) is being used to study the causal impact of the German grant program (BAföG). Although the underlying process of assignment is not random, pillar 5 collects data on allocation rules for student grants and loans (BAföG). Thus, students who just fulfill the eligibility criteria can be compared to those who just fail to fulfill them. Another natural experiment is designed to study the effects of a break in the educational career due to compulsory military or social service.

9.3 Non-market-returns to education

Apart from monetary economic returns and returns in terms of later education, there are additional nonmonetary returns to education in several areas. Most notably, non-market-returns may come in the form of better health (Sect. 9.3.1), greater subjective well-being (Sect. 9.3.2), reduced crime (Sect. 9.3.3), increased social and political participation (Sect. 9.3.4), and modified family formation (Sect. 9.3.5).

9.3.1 Health and health behavior

The relationship between people's educational background and their health has been a much neglected issue in the standard analysis of returns to education. Physical as well as mental health may be determined by one's education to a great extent. Well-educated people are expected to be inclined toward health-conscious behavior (cf. Grossman 2006). They live on higher quality nutrition, smoke less, are less likely to consume drugs, and are more physically active (e.g., Jungbauer-Gans and Gross 2009). Overweight and obesity in youth has considerable impact on health status in later life, and chronic diseases such as diabetes and hypertension constitute an increasing share of health expenditure.

The measurement of returns to education with respect to health outcomes is likely to produce a considerable bias if it disregards the endogeneity of the causal effect. One of the central findings in the sociology of health is that education (in addition to socioeconomic status and income, which themselves depend on education to a great degree) correlates highly with morbidity and mortality. Furthermore, it has been shown that the so-called social gradient in health has even increased over time (Mackenbach 2006). In recent years, the focus of research efforts has shifted to models explaining the correlation between education and health.

Working and living conditions include specific resources (material and psychosocial environment), psychological stress, and environmental stress. We focus on the interplay of behaviors, cognitions, and emotions addressed by the theoretical approach of effort-reward imbalance (Siegrist 1996). This approach relies on the notion of social reciprocity. Mutual cooperative investments are based on the norm of return expectancy in which efforts are equalized by respective awards. Violations of this norm cause strong negative

emotions, whereas appropriate social rewards promote well-being and health. It is mainly the imbalance between a high level of effort invested in working life and a low reward structure that is causal for chronic distress. Chronic distress itself is seen as one of the most influential dimensions affecting poor health outcomes such as higher morbidity and higher mortality (Rugulies and Siegrist 2002).

Health habits and risk behavior like smoking, drinking alcohol, substance abuse, sport, and nutrition have been shown to not only correlate with education but also influence physical and mental health (e.g., Jungbauer-Gans and Gross 2009). The theoretical discussion on determinants of health suggests that some indicators of health behavior should be included especially when surveying children and young adults. During late childhood and adolescence, risk behavior like smoking or drinking alcohol is initiated, and health habits are developed that influence health in later life (Langness et al. 2005). Smoking as one part of this dimension is related more strongly to education than to income (Gross and Groß 2008). Nutrition has an impact on body weight that is important with respect to cardiovascular diseases or arthropathy. Because nutrition and also to some extent physical activities cannot be measured in an economic way, we use the Body Mass Index (BMI) as proxy. The BMI is the customary index of weight calculated using body weight and height. In addition, physical activities, especially performed in groups or sport clubs, are also seen as a learning environment, and therefore belong to pillar 2 (see Chap. 6, this volume).

The use of medical care depends on education, income, and socioeconomic status even in countries in which health insurance covers most expenses for almost all people. Several important indicators of health in early childhood correlate with the social status of parents. This is especially important in early childhood when medical care is a substantial need, especially for newborns, and health shortcomings can have a major impact on early child development. Moreover, serious complications at birth (e.g., prematurity) may cause long lasting delays in child development that are detrimental to learning processes. Indicators are body weight and height at the time of birth, complications at birth (prematurity, serious problems during the first 4 weeks of life), and use of medical care.

Furthermore, selection processes could take place when educational outcomes, labor market participation, or (downward) social mobility are influenced by health status. This may lead to an endogeneity bias when the returns of education on health are estimated. Thus, there are reasons to consider both causal paths: The first path treats health as one dimension of nonmonetary returns to education, and the reversed causal path argues that educational outcomes themselves are influenced by the health status (e.g., disabilities or mental health) during school (see, e.g., Jungbauer-Gans and Gross 2009). The use of panel data could shed some light on which of these paths is more important.

Whenever we survey children and adolescents, we also have to control for their socioeconomic status, the education of their parents, and their migration background (Wadsworth and Bartley 2006). Empirical evidence shows that the social status of parents correlates with the competence and the educational attainment of children (e.g., Fuchs and Wößmann 2007). The social status of parents, too, may influence health status and health behavior of children. A migration background and potentially related language barriers can lead to poor understanding in dialogue with physicians. This may trigger

disadvantages even when the physician's time is distributed equally between all patients (Balsa and McGuire 2001).

Another important issue is how far cognitive competencies as well as knowledge about health and medicine mediate between education and health status or health behavior. Therefore, the application of scientific knowledge on issues of health evaluated in pillar I can be used to assess the meaning of knowledge for health outcomes in a straightforward manner. In the economics of health, Grossman (1972) argues that better educated persons are able to produce health more efficiently due to their knowledge about risky or health-promoting behavior (Becker 1964).

Health in general is a multidimensional construct that includes physical, emotional, mental, social, and behavior-related dimensions of well-being and productivity (Schumacher et al. 2003). Measurements of health without using laboratory data and medical records have been shown to have high predictive validity even when mortality is considered (Idler and Benyamini 1997; Schwarze et al. 2000). A fundamental indicator is self-rated health measured on a Likert scale. Chronic illnesses and disabilities are included together with a statement asking whether and how far these illnesses and disabilities impair school attendance, learning processes, and school-related activities. Finally, days absent from school due to illness seems to be a simple indicator of health status. Additionally, this indicator can be easily combined with school absenteeism due to truancy as an early form of deviant behavior.

9.3.2 Subjective well-being and education

Monetary and nonmonetary outcomes of education can be brought together within the broad concept of individual subjective well-being, thus providing an integrated picture of the welfare effects of education. Economic theory assumes that utility is a function of income, leisure, and probably of health. Education enters this function only indirectly as a productivity- and health-enhancing factor. However, an interesting question in this context is whether education has a genuine direct impact on well-being. A direct test of such a hypothesis would require an econometric model in which life satisfaction is regressed on education and earnings, health, leisure, and other control variables. Nowadays, there is a broad consensus that responses to questions about life satisfaction or specific domains are valid measures of individual well-being or utility (Frey and Stutzer 2002). Although the economic literature on life satisfaction is publishing a growing number of regressions containing education as a control variable, evidence is still puzzling and ambiguous: For the most part, studies show a slightly positive impact of education on well-being; however, a negative effect of education on satisfaction can also be observed (Argyle 2003; Blanchflower and Oswald 2004; Schwarze and Härpfer 2007). The direction of causality between education and satisfaction is still unclear. Heckman (1976), for example, enters the human capital stock into the utility function multiplicatively in connection with leisure, assuming that education leads to a more efficient use of leisure. Thus, education is expected to have a positive impact on life satisfaction. However, if satisfaction measures something like optimism, and if optimistic people tend to be more successful, they will also tend to have a higher education (Argyle 2003). Moreover, better education might increase expectations about earnings and other employment-related outcomes. If

expectations are not realized in later life, well-educated people might be less satisfied with their lives. In addition, overeducation may also cause dissatisfaction. Since these losses of utility cannot be compensated by a reasonable wage increase at the start of the first employment, overeducation is mostly involuntary and enhances productivity costs. However, negative consequences of overeducation diminish with professional experience (Verhaest and Omey 2009).

In summary, empirical analyses of the satisfaction-education nexus have to be carried out cautiously due to problems of endogeneity, selection bias, and omitted variables. This shows that data quality and econometric modeling are important issues. Most of these problems can be tackled by studying the process of education and development of individual well-being (satisfaction) simultaneously from the early stages onward across the whole life course. Pillar 5 offers a coherent design for answering questions on satisfaction over the whole life course and focuses on life satisfaction as well as satisfaction with health, standard of living, family, friends, and the currently predominant activity (school, vocational education and training, studies, or work). All these concepts of subjective well-being capture topics that are supposed to correlate with educational success. Additionally, each domain is applicable over the whole life course, beginning in the early school years (cf. Cummins 2006; Cummins and Lau 2005).

9.3.3 Criminal behavior and deviance

Criminological studies show that “typically, criminal offending begins in preadolescence, peaks sharply during adolescence, and rapidly declines in the transition to young adulthood” (Sampson and Laub 2004, p. 296). Education may therefore yield returns not only in terms of reduced crime but also in terms of desistance from crime over the life course (Sampson and Laub 2004). Education may lead to less urban poverty and inequality, because schooling may induce individuals to commit less crime by increasing the returns to legal work and the opportunity costs of criminal activities. Moreover, education might impact on preferences such as patience and risk aversion, thereby also reducing criminal activity. Recent evidence from the United States centered on the longitudinal NLSY data estimates the returns to education in terms of reduced crime (Lochner and Moretti 2004). Research into the age distribution of criminal activity has shown that most offences are committed in the mid to late teens, after which the prevalence of offences declines (e.g., Sampson and Laub 1993). Boys commit more offences than girls; and migrants more than native Germans. Students attending Gymnasium report less delinquent behavior than students in other types of schools (Baier and Pfeiffer 2007). Analyses of the determinants of delinquent behavior reveal that both experienced violence in the family and the influence of the peer group are important. Other forms of deviance such as playing (violent) video games, excessive alcohol consumption, acceptance of norms of masculinity, and reduced self-control are also associated with delinquent behavior, but the causality remains unclear (Baier and Pfeiffer 2007). Panel and maturation effects are a matter of serious concern in longitudinal studies that rely on self-reported data of delinquent behavior (Lauritsen 1998). However, correlations of self-reported data with race and class or other determinants are consistent with results from official delinquency estimates (Maxfield et al. 2000). It is to be expected that questions on own criminal behavior or impris-

onment will induce socially desirable answers and lead to a biased mapping of events in this domain. Therefore, this domain is difficult to implement in panel studies in which a positive identification with the survey is crucial to minimize panel attrition. Like health, criminal behavior is also affected by many determinants beyond social, educational, and material aspects. In particular, family history, events in childhood, and psychological factors seem to play an important role, as well as the personal history of delinquency. However, most of these aspects are impossible to measure in an adult sample. Finally, delinquency is most prevalent during youth and late adolescence (particularly in males) and decreases rapidly in older age groups. Thus, measuring this domain should be more productive in stages 5 and 6 of NEPS rather than in stage 7 in which probably only very few persons will show (and admit) tendencies toward criminal behavior. Relevant indicators included in the NEPS are misdemeanors (like shoplifting or willful damage to property), active violent delinquency, violence at school, and truancy. Due to restrictions in time, only sociodemographic variables can be included in NEPS as determinants of delinquent behavior along with those indicators that are also of great interest to the other pillars such as self-control, acceptance of norms of masculinity, consumption of violent videos or computer games, or prosocial and disruptive behavior.

9.3.4 Political and social participation

Education has a substantial impact on how far individuals partake in the community. Having specific competencies and skills is a necessary precondition for participation in social life and becoming a respected member of society through civic participation, civic knowledge, and attitudes. Rich information about social background factors, attitudes, personal traits, values, and motivations gathered by the NEPS will allow researchers to analyze the causal link between a person's education and her or his propensity to community participation. This can significantly improve our understanding of the determinants of, for example, volunteering (for evidence in the U.S. and U.K., cf. Dee 2004; for Germany, Erlinghagen et al. 1999). The new insights can be incorporated into the calculation of private and social rates of return to education.

The indicators for social and political participation may be assigned to two major dimensions: attitudes and behavior. Although attitudes may originate in knowledge based on education, they may also lead to a selective information-seeking process. However, political and social participation can obviously be seen as a consequence of educational background (Hadjar and Becker 2006, 2007). The correlation between attitudes and behavior has also been discussed broadly (e.g., Fishbein and Ajzen 1975). Political action as a whole (including illegal demonstrations as well as voter participation), but also membership of and activities in political organizations can be regarded as behavioral indicators of political participation. In contrast, interest in and personal distance to politics can be assigned to the attitudinal dimension of political participation. Social participation involves the frequently used measurements of social trust toward fellow citizens and the anomia items known from the German ALLBUS. Furthermore, behavioral aspects are represented by active membership in organizations, voluntary work, and participation in school and cultural activities. The behavioral dimension of social and political participa-

tion is seen in the light of learning environments (pillar 2). Therefore, it is discussed in Chap. 6 of this volume.

9.3.5 Family formation and educational homogamy

In the course of educational expansion, the share of women participating in higher education has increased dramatically in recent decades (Erikson and Jonsson 1996). For the educational system as a marriage market, this means that the likelihood of finding a partner of the opposite sex with a homogeneous educational level has also enlarged across cohorts (Blossfeld and Timm 2003). Several studies have shown a strong inverse relationship between fertility and education for women in postindustrial societies. Better educated women and men are older at the time of the birth of their first child than less educated women and men. But, whereas better educated women more often remain childless, the opposite is true for men (e.g., Kravdal and Rindfuss 2008). Bauer and Jacob (2010) pinpoint on the constellation of both partners' educational level to explain parenthood: Traditional couples with men who are higher educated than women are most likely to have children followed by couples with equally educated partners, which at least exceeds couples with better educated women. In the United States, the relationship between education and family formation has also been shown to vary by ethnic background (Glick et al. 2006).

Additionally, unemployment leads to a postponement of the first child's birth. Whereas in western Germany, the unemployment of the male partner leads to this shift, in eastern Germany, it is female unemployment in couples that leads to a deferment of starting a family. Kreyenfeld (2010) found that the relationship between job uncertainty and postponement of parenthood varies with the woman's educational level. Whereas highly educated women react to employment uncertainty by postponing their first child's birth, women with low educational background respond by starting a family.

The NEPS provides very detailed data on the respondents' educational enrollment, competencies, and employment combined with some relevant data on their partners or spouses. This provides optimal conditions for exploring the dynamics and interdependencies of educational enrollment and family aspirations.

9.4 Conclusion

Pillar 5 dealing with monetary and nonmonetary returns to education responds to the fact that education plays a crucial role in many areas of life in (post-)modern societies. A long-term panel study like the NEPS is well advised to focus on aspects going beyond competencies and knowledge. Several other aspects besides education might be important for income, health, well-being, deviant behavior, or social and political participation, and these aspects need to be covered by appropriate theoretical frameworks. Pillar 5 provides items adjusted to the requirements of the different stages and target persons included in NEPS while continuing to ensure coherence. The longitudinal quality of the data and natural experiments allows us to address issues of causality, thereby rendering the data of interest to economists as well as sociologists.

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