

Within-Couple Specialization in Paid Work: A Long-term Pattern?

A Dual Trajectory Approach to Linking Lives

Laura Langner^a

ABSTRACT Research on the division of labour has mainly focussed on transitions between individuals' labour market states during the first years of parenthood. A common conclusion has been that couples specialize – women in unpaid and men in paid work – either due to gender ideologies or a comparative advantage in the labour market. But what happens later in life? The German Socio-Economic Panel now provides researchers with a continuous measure of working hours across decades of couples' lives, enabling dual trajectory analysis to explore couples' long-term specialization patterns. I will examine the career trajectories of West German couples and, more specifically, will focus on the 1956-65 female birth cohort due to the relatively low institutional and normative support for female employment during that population's early years. Even in this setting and by a conservative estimate, a surprisingly small number of couples – only a fifth – adopt full specialization in later life. A sizable proportion – a third – moves into dual full-time employment. This trend is even more common among highly educated couples: half of those couples move into dual full-time employment. I find that highly educated women are not only less likely to permanently specialize but also more likely to try working full-time, possibly because their partners' comparative advantages are lower. But despite high opportunity costs, 45% of highly educated parents never try to pursue a dual career either because of a satiation of material wants or because of low societal support for maternal employment. The latter phenomenon is further underscored by the finding that couples' increase in working hours occurs only when a youngest child is a teenager.

^aNuffield College, New Road, Oxford OX1 1NF, United Kingdom,
laura.langner@sociology.ox.ac.uk, Tel.: 0044-7411700676

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1. Introduction

The question of how couples divide their paid and unpaid working hours has taken particular prominence in scholarly debates since Becker's *A Treatise on the Family* (1991). According to Becker's economic argument, couples divide paid and unpaid work according to who has the comparative advantage or who is relatively more efficient in each sector (either market or household) in order to maximise a joint household utility function (Becker, 1985, 1991). Both economists' and sociologists' analyses have supported the conclusion that women opt out of work or reduce their career investments whilst men invest more heavily in their careers. Two very different reasons are put forward: first, women are more likely to have a comparative disadvantage; and second, women may pursue different goals due to gender ideologies.

What may have been forgotten in the debate is that for very sound practical reasons couples may choose not to specialize in the long term. If one moves away from assuming that income-maximization will be the major couple-level goal, further possible motivations for choosing not to specialize emerge. For example, a woman may desire to pursue a career, irrespective of its short-term economic rationality, which will allow her to attain a status which reflects her past achievements. Moreover, the couple may be reluctant to let go of one partner's pre-birth human capital investments for practical reasons. (Doctors, for instance, may be required to refresh or maintain their human capital in order to demonstrate a continuous record of professional development which is needed for their professional registration.) Even when viewed from the perspective of economic rationality, a comparative advantage might vanish once unpaid work has decreased in importance or once one partner has maximised out his or her potential in the labour market. In this case, couples may decide that it is more sensible to take turns (i.e. prioritize the other partner's career). Becker and Moen's qualitative work supports this "taking turns" approach to life course work hour

investment (1999). Moreover, a couple may lower their financial risks by investing in both partners' careers. Additionally, a woman's individual-level financial risk – in the case of divorce, for example – can be decreased if the woman does not opt out of her career.

Against the backdrop of these sound alternatives available to couples, it is more likely that the division of labour is dynamic throughout the life course, with short-term inequalities based on a comparative advantage of one partner in the labour market not resulting in long-term specialization. Because of these alternatives and also because of methodological advances outlined below, the time has come to re-think the way in which the question “Do couples specialize?” is analysed.

Previous analyses have not been adequately designed to address this question. Methodologically, despite theoretical claims to the contrary, couples' lives have traditionally been de-linked or the longitudinal dimension has been simplified. This was mainly due to a lack of appropriate data. As a consequence of the long lead-time required for prospective data, researchers often had to settle for retrospective data to cover the life course, which relies on the recall of the interviewee. As a result, only a categorical measurement (part-time, full-time, non-employed) of previous levels of engagement in paid work was feasible. In turn, due to the categorical nature of the variable, researchers tended to focus on *transitions* between *states* rather than the life course *trajectory dynamics*. Whenever panel data was used, the analytical approaches applied to retrospective data or a two time-point comparison was used. Furthermore, the longitudinal dimension was often explored only partially by focussing on the time around the first childbirth rather than later life course stages (e.g. Stier, Lewin-Epstein, & Braun, 2001). Interesting differences in labour distribution tend to occur after the couples' youngest child moves beyond its first years.

Straightforwardly, one would operationalize the question of how couples divide their paid working hours throughout their lives as a set of *linked pairs of alternative work-hour trajectories* – one for each partner – spanning the life course.

Working with these two curves, the question of couples' life course work hour strategies becomes a question of

- (a) Opening the *vertical black box* of how working hours are divided between partners [linking lives at the cross-sectional level].
- (b) Opening the *horizontal black box* of how the division of labour between partners develops over time [life course analysis].
- (c) Understanding *variations* in the vertical and longitudinal dimensions depicted through the seven different ideal-types of couples [exploring heterogeneity] (see figure 1a).

In looking at explanatory factors for which type of couple might end up in either pattern, the first one to turn to is educational level. This variable in particular has been found to be associated with labour market investment in the work-family literature in the past (Blossfeld & Drobnic, 2001, Brynin & Schupp, 2000, Dex, 2008).

The German Socio-Economic Panelⁱ, which covers up to 30 years of peoples' lives *prospectively*, can shed new light on which *different types* of *long-term* work hour strategies *couples* pursue. Since both partners are interviewed across their lives, it allows the life course developments of husband and wife to be linked together (see (a)) via two trajectories (see (b)). The relatively large number of observations further enables the assessment of the heterogeneity of couples' joint over-time work hour trajectories (c) to find out how many couples pursue distinct long-term work hour strategies other than within-couple specialization. Surprisingly, these recent possibilities have remained unused.

A study on West Germany by Kühhirt did address the longitudinal dimension. His research looked at how the share in female pre-birth income was linked to *either men's or women's* subsequent work hour investment. This did not allow for drawing conclusions about how the *two partners'* work hour investment trajectories were *linked over time* (Kühhirt, 2012). In contrast, I examine how men's and women's work hour trajectories evolve jointly. This allows me to make inferences about how *joint career trajectories* are shaped by joint education. More importantly however, I built *heterogeneous groups* of joint work hour trajectories (i.e. I group based on the dependent variable), before looking at how these different patterns are related to the independent variable (education). In contrast, Kühhirt looks at how the *average* work hour curve changes depending on the independent variable.

West Germany is a particularly interesting case. On the one hand, like other countries in the Western world, ever more women have entered the labour market (Simonson, Gordo, & Titova, 2011). On the other hand, former West Germany differs from other countries in several important respects. First, approval of maternal employment has been particularly low: In 2005/6 48% were against full-time maternal employment if the child was younger than three. In comparison, only 12% of the Danish sample was against maternal employment at that life course stage (Steiber & Haas, 2010). Second, the attitudes in former West Germany are reflected in a traditionally low level of institutional support. Even in 2006, only 7% of under-three year-olds were provided with childcare (compared to 37% in former East Germany) (Destatis, 2007). Third, even the childcare that couples were lucky enough to obtain oftentimes did not cover the whole working day. Similarly, primary school ended at around 2 pm (Steiber & Haas, 2010). In order to prevent the confusion of differential historical developments, the study focusses on the 1956-65 birth cohort. The cohort was chosen because normative and institutional support for mothers' paid employment was lower

than in later cohorts. By focussing on this particularly challenged group, one gets a lower-bound conservative estimate of how many couples do not specialize or de-specialize in the long term.

Against this backdrop, this paper seeks to revisit the topic of a couples' specialization in paid and unpaid work to expand our answers to the following questions:

- (1) To what extent do couples specialize in paid and unpaid work in the longer term (over the life course)?
- (2) To what extent is the educational level of partners related to long-term specialization?

Because later life stages are of interest, the events are clocked according to the age of the youngest rather than the oldest child.

2. Theories and Findings on the Division of Labour

Much research on within-couple specialization draws on Becker's argument that couples divide paid and unpaid work according to who has the comparative advantage / is relatively more efficient in each sphere. It is assumed that both partners try to maximise a joint household utility function (1985, 1991).ⁱⁱ Especially after childbirth, the demands on a couple's time increase. Consequently, this period has been of particular interest to researchers.

Theoretically, several arguments speak against permanent specialization. First, one has to distinguish between short-term and long-term choices. Economically, in the short term it may make sense to let the woman invest in unpaid and the man in paid work because the child requires a lot of attention early on in life – especially from the breastfeeding mother and because the husband will generally earn a higher wage at this stage. The question arises as to

whether in the long term, once the children are grown-up, old specialization patterns would still maximise the joint utility function. After all, the comparative advantage may shift. One partner may have exhausted their potential at the workplace. Children may no longer require as much maternal attention when the child is in its teens. Consequently, the partner specialized in unpaid work may no longer be needed as much in the domestic sphere, which frees up time to be invested in paid work. In short, in a couple in which the man has specialized in paid and the woman in unpaid work, the man might not earn more if he spends an hour more on the job whilst the woman has not reached the final career stage and can therefore increase joint earnings by re-investing in her career.

If the male partner earns a low wage, her wage may be needed for the family to survive. This may be less of an issue when children are young as child allowance and paid parental leave may cover the costs. Especially as children enter their teens, the annual expenditure per child is likely to increase.ⁱⁱⁱ Consequently, over time the family may become more and more dependent on her income. As a result, she may be increasing her working hours.

Economic considerations aside, women may have invested heavily in their career prior to childbirth and therefore only have planned to take a temporary career break – when children require more parental attention – rather than leaving their career for good. Furthermore, she may be pursuing a career for its own sake, being driven by status rather than money.

Finally, as Oppenheimer (1997) points out, specializing can be a risky strategy. The risk can be thought of as a couple-level variable or an individual-level variable. If the husband has an accident or becomes unemployed, then the family's future is jeopardised. If, however, both partners could potentially support the family, then this risk can be decreased.

From the woman's perspective, the decision not to invest in her career entails a high financial risk in the case of break-up or widowhood.

Analyses on the Western world have come to the conclusion that women reduce their working hours around the birth of their first child (Blossfeld and Drobnic, 2001, Kan, 2007, Sanchez and Thomson, 1997, Steiber and Haas, 2010, Stier, Lewin-Epstein and Braun, 2001, Waldfogel *et al.*, 1999). Stier and colleagues (2001) examined women's working hours slightly later in the child's life. They focussed on a two time-point comparison of women's employment states when there was a pre-school child in the household and when it was of school age. According to their analysis, a low proportion of women in West Germany were employed full-time at both time-points or shifted from part-time to full-time employment by the time the child was of school age (20%). 50% remained non-employed.

But what happens to couples' working hours even later in life? Individual-level (not couple-level) data suggest that the work hour reduction shifts again later in life. Steiber and Haas, using data from 2004/5 and 2006/7, predicted that dual full-time employment within couples would take on the following pattern: 60% dual full-time employment for childless, approximately 12% for parents of small children and then a steady increase back to slightly above 40% once the children leave home (2010: 265). Kühhirt (2012) goes one step further on the longitudinal dimension and uses over 20 SOEP waves. The fixed effects regressions show that men decreased their market hours by 1.5 to 3.5 hours when their youngest child turns 18. Meanwhile, when the youngest child turned 18 women who earned less than 45% of the couple's income in the pre-birth years still fell 2 hours behind pre-birth working hours, whilst those earning 55% and above reached almost pre-birth working hours. These findings on *individuals* suggest that *couples'* initial work hour investment strategies change at a later

stage. Yet how they do so in relation to one another and how these different couple-level strategies are distributed within the population still remains unclear.

Besides the hints from the quantitative data discussed above, alternative explanations are further supported by Becker and Moen's qualitative findings; about a third of the couples were taking turns with regards to who placed limits on their career across the life course. "Trading off was also a strategy that allowed couples to readjust from a one-job, one-career marriage to a two-career marriage" (1999).

Which sorts of couples might one expect to adopt other strategies? If men and women are concerned about human capital loss, then one would expect couples in which *women are highly educated* to avoid a long-term specialization strategy. Moreover, the money which a highly educated mother may earn by returning to work may provide the couple with enough resources to invest in private childcare (remember the low institutional support mentioned above) and to outsource other housework (Cohen, 1998). This in turn would allow the mother to work full-time relatively sooner after the birth.^{iv} Past findings on the first transition after childbirth suggest, however, that even when highly educated, West German women were not significantly more likely to re-enter full-time careers after childbirth (Blossfeld, Drobnic & Rohwer, 2001).

A *husband's high education* can affect the woman's time investment both negatively and positively. On the one hand, it may make female employment unnecessary as it is no longer required to meet the couples' financial demands. The couple may be content enough with their financial situation to pursue non-monetary rewards both inside and outside the labour market rather than further increasing their joint labour market participation (related to John Stuart Mill's view of the satiability of wants (Mill, 1871)). That such a mechanism may be at play is suggested by Cha's finding that professional mothers partnered to men who

worked high hours were more likely to opt out of the labour market than women partnered to men working low hours (2010). On the other hand, the financial reward associated with education may provide the couple with enough resources to outsource household labour, which would allow the wife to return to the labour market sooner. In sum, existing theories of the relationship between a man's high education and the woman's work investment are inconclusive.

If the *husband is at the bottom end* of the education distribution, couples may be forced by financial constraints to re-enter high hour dual employment, especially as children grow older.

3. Data, Methods and Measures

3.1. Sample

The analysis uses the German Socio-Economic Panel Study (SOEP), an annual whole household repeated measures study. This study has been conducted in the Federal Republic of Germany / West Germany since 1984. Household members are interviewed on an annual basis for the study, allowing individuals and their immediate household members to be followed over time. Version 28 of the SOEP is used for the analysis^v. West German couples in which the woman was born between 1956 and 1965 are selected. The sample includes both married and cohabiting couples but excludes all singles. For ease of interpretation, only heterosexual couples are examined. Moreover, only couples in which the youngest child is younger than 21 years are kept within the study. It can be reasonably assumed that a couple which has not shifted to another division of labour at this stage will never do so. Periods of employment as well as periods of non-employment are included, to account for the most

extreme form of specialization, as well as for shifts away from this extreme form of specialization.

The length of the observation window poses particular challenges. On the one hand, the best approximation to the individual-level trajectory must be found. Ideally, one would use a balanced sample. A long balanced panel, however, results in a highly selective sample: Respondents replying to a large number of consecutive waves differ systematically from other respondents (see sensitivity analysis). Moreover, it radically reduces the sample size. The following stringent sample definition ensures a good approximation of the individual-level trajectory whilst at the same time allowing for a conservative estimate of de-specialisation and a large enough sample size:

- The parents must be observed at least once when the child is between one and four years old. The age of four is chosen as the cut-off point because since 1992 mothers on parental leave may not be laid off until the child turns three (BMFSFJ, 2012).
- They must be observed at least once when the youngest child is 4-13 and again when the youngest child is 14-20 in order to capture what is happening in the later childhood years.

The analytical requirements reduce the number of couples from 3312 down to 505. Within this sample everyone is observed at least six times and 50% of the sample is observed 19 times or more.

3.2. Past Analytical Approaches to the Division of Labour

As mentioned in the introduction, due to a lack in panel data maturity (i.e. panel data not covering long observation windows in the past) past research using retrospective data focussed on *transitions* between *states* rather than the life course *trajectory dynamics*. Whilst sequence analysis covers multiple states across the life course, similarities between two life courses are difficult to identify (Abbott & Hrycak, 1990; Aisenbrey & Fasang, 2010; Wu,

2000). Moreover, retrospective data underestimates the number of labour market transitions (Manzoni, 2012). Whenever panel data was used, oftentimes the analytical approaches applied to retrospective data or a two time-point comparison was used. Whatever happened between the transitions from part-time to full-time employment and within a category (e.g. did full-time employed men reduce hours from 50 to 40?) remained unclear. Furthermore, the longitudinal dimension was often explored only partially by focussing on the time around the first childbirth rather than later life-course stages. The analyses thereby in essence ignored other and potentially more important longitudinal developments. The importance of the later period is also indicated by Steiber and Haas' (2010) and Kühhirt's (2012) findings. However, Steiber and Haas' findings are based on cross-sectional data, and whilst Kühhirt (2012) goes one step further and uses over 20 SOEP waves, he does not look at how the working hours relate to one another within the couple.

The categorical operationalization also resulted in a cruder measurement on the vertical (couple-level) dimension: Instead of focussing on *relative hours* (e.g. he 44, she 34), which is the focus of Becker's theory, they focussed on the less interesting but more easily accessible *relative states* (e.g. he full-time, she part-time). De-specialization could consequently only be captured if either the husband moved into part-time or the wife into full-time employment. Also, models (such as seemingly unrelated regressions or clustered standard errors), whilst accounting for interdependence, did not model how partners' outcomes were interrelated (e.g. Killewald & Gough, 2013). If the cross-partner influence was modelled in the fixed part, it was depicted as a uni-directional influence with the direction of causality running from the partner to the respondent (e.g. Bernardi, 1999). A bidirectional influence is more likely, however. Furthermore, the average couple was mostly of interest. Whilst the average couple may be specialized, at any point in time an equal

division of labour and, in the long run, some dual career strategies may be hidden within this average pattern.

3.3. Analytical Approach

To properly address the division of labour question across the life course, the method is required to cover both the horizontal and the vertical dimensions and to distinguish between different types of couples. I see the drawing of two curves as the most intuitive representation of couples' careers. As I am not only interested in the average curve of men and women but also in their variations, I have to classify couples into different joint work hour trajectory groups. Instead of using independent variables as factors determining the variability "about the population's mean trajectory of development" (Nagin, 2005: 7) – which would be the common approach in growth-curve analysis – the work hour trajectories are categorized into groups by the researcher (deductive approach) based on prior findings. These groups are subsequently used as an independent variable in a growth-curve analysis to model over-time differences in work hour trajectories. To account for couple-level dependencies in this article, the couple is explicitly modelled as a unit both via a dyadic index and via a model with two dependent variables (referred to as multivariate in the literature e.g. Snijders & Bosker, 2012).

In a second step, a group-based trajectory model is run to test whether the same dominant patterns emerge from the data (see appendix).^{vi}

3.4. Variables

For all analyses, hours are reported as being "usually worked in a week". Hours are coded as zero if the person does not work.

One major departure in what follows from much previous work is the "analytic clock". The oldest child's age is conventionally taken as the time-giver because, according to

Becker (1991) and subsequent researchers, the birth of this child is an important determinant of how much time the couple has left for paid work. But whilst the oldest child may be responsible for work hour reductions, it can reasonably be assumed that the youngest child's institutional location will determine the couples' re-investment strategies. For this reason, the age of the youngest child is chosen here as the time scale along which the two partners' work hour changes are observed. For this purpose, the youngest child is selected within each household and its current age is matched to the two parents.

3.4.1. His and Her Individual-Level Trajectories

Past research has shown that work hour patterns differ between women and men, with women following a more diverse range of work hour trajectories (e.g. Blossfeld, et al., 2001). Based on past research, visual data inspection and the group-based trajectory model (see appendix), her work hour trajectories can be categorized into the following groups using the following procedure: First, the maximum number of hours worked in the periods where the youngest child is aged 0 to 4, 5 to 13, and 14+ are calculated for each individual. The rationale behind the age choice is that women can return to their former employer for up to three years after having given birth. Hence, one can argue that a key labour market decision will have been made in the subsequent year. 14 years are chosen because the group-based trajectory analysis suggests that most trajectories have reached a plateau at this point.

Women are subsequently classified as *a housewife* if the maximum number of hours worked is zero across all periods. They are further coded as housewives if they are categorized as such by the group-based trajectory model (as in this case most data points will be around zero) and if they never work above 15 hours. This gives more weight to women being housewives to again ensure a very conservative estimate of de-specialization. If in the early period, women work zero hours but in subsequent periods more than zero but less than

35 hours, they are categorized as *eventually working part-time*. If they eventually work more than 35 hours they are categorized as *eventually working full-time*. If women work more than zero but less than 35 hours in all periods, they are categorized as *part-time* workers. Similarly, if women work more than 35 hours in all of the observation windows, they are categorized as *full-time* workers. Women whose work hours eventually decrease are coded as *decreasing*. If, however, they unsuccessfully tried working full-time at some point they are coded as decreasing *tried full-time*. The theoretical consideration underlying this distinction is that women who have the opportunity to try out full-time employment may differ from those who never make use of this opportunity. The cut-off point of 35 hours equates approximately a full-time work-week or a full-time week minus the breaks. In summary, there are seven types of individual career trajectories for women:

- Housewife
- Eventually part-time
- Part-time throughout
- Eventually full-time
- Full-time throughout
- Decreasing from part-time
- Tried full-time but decreased working hours again

For him, the work hour patterns are likely to be less varied because few men move into part-time employment or take time off after childbirth. This makes re-investment less likely (Blossfeld, et al., 2001). As pointed out earlier, even if men are unlikely to become temporary housemen, or to work part-time, they may nevertheless vary their hours within the full-time range or undertake part-time employment at a later stage (Becker & Moen, 1999). Men are categorized as pursuing either *stable* or *increasing* working hours towards or above

full-time employment, or ***decreasing*** working hours. Therefore, it makes sense to categorize his work hour trajectories into four groups:

- Increasing hours
- Stable hours
- Decreasing within the full-time employment range
- Decreasing to part-time employment

3.4.2. Combining the Individual-Level Trajectories into Couple-Level Trajectories

Having categorized the main female and male work hour trajectories at the individual level, the couples' trajectories are now categorized according to how the partners' trajectories relate to one another over time within the couple. Whilst the previous categorization is helpful to arrive at the general categories, a visual inspection of each couple is necessary at this stage to be able to find specific approaches such as the taking turns approach. When combining the individual trajectories, the following patterns can be distinguished:

- Permanent Specialization (She a housewife or working fewer than 15 hours, he stable or increasing hours)
- Eventual Specialization (She works but decreases hours eventually, he stable or increasing hours)
- He Career, She Job (She works few hours (i.e. below 35) at some point, he works stable or increasing hours)
- He Career, She Tries Full-Time (Like the previous couple, only that she works full-time for some time)
- He Career, She Eventually Career (She increases hours to full-time, he stable or increasing hours)
- Dual Career Couple (both try to work full-time throughout with potentially some time off in the first three years for the mother)
- Taking Turns (she increases hours to full-time, he decreases hours – with the potential for both to cross)

There are obviously also variants (e.g. by timing of re-entering) but these cannot be considered due to the sample size.

4. Results

4.1. Depicting the Average Growth-Curve for Each Couple-Level Work Hour Pattern

Figures 1a and 1b indicate the variety of work hour patterns pursued in the data by depicting the average development both in absolute and in relative terms within each group. The figures give a sense of how absolute levels and relative working hours differ over time.

Regarding the shifts along the age of the youngest child, on average most final work hour shifts occur at a later stage in the youngest child's life. Couples, in which she pursues a job or tries working full-time, reach their maximum working hours when the child is in its teens and has consequently entered high school. Couples who take turns do so when the child is around high school age, on average. What is surprising is that if she eventually pursues a career, she does so at a very late age – on average when the child is around eighteen and hence an adult. The only exception to the late maximization pattern is the dual career couple, which re-enters dual full-time employment early (before the age of three) and reaches a plateau when the child enters primary school.

Regarding the relative working hours, figure 1b shows that the last three types of couples reach an equal division of labour on average (with him working 50% of the joint working hours). Moreover, in a he career, she job constellation or when she tries to work full-time, the average becomes progressively less unequal (on average reaching a division of 30/70).

[Figure 1a]

[Figure 1b]

These curves are averages for each group and thereby a summary of each of the patterns. Still, had one compiled these couples into a single average figure, one would not have been able to discern the important differences depicted in figure 1a. How are these different patterns distributed across the sample?

[Figure 2]

According to figure 2, fewer couples specialize than expected in the long term. Specializing couples, including those in which the woman is predominantly a housewife and those in which she scales back her working hours later in life, make up only about 21.4% of the couples. The dominant category remains the he career, she job couple. In 34.2% of the cases the woman works at least part-time. However, in 36.5% of the cases the woman works full-time at some point. Among these couples, there are about 6.8% in which the husband scales back whilst the wife re-invests in her career. 3.1% pursue a dual career throughout and in 12.9% of the couples she is able to re-enter her career at a later stage. 13.7% of couples try the dual career route but move back to a single full-time employment pattern later in life.

4.2. The Relationship between Work Hour Trajectories and Education

[Figure 3]

An immediate question which arises is whether the different work hour trajectory combinations are tied to different combinations of educational qualification. Figure 3 shows how the different joint work hour trajectories are distributed depending on the educational combination of the couple. Low education refers to any education below a tertiary degree and high education to having obtained a tertiary degree. To test for the significance of the observed distributions, a sequence of multinomial regressions is run, from which the discrete

change in the predicted probability from the base level is derived.^{vii} The coefficients are plotted in figures 4a-b. Read horizontally, the picture below presents the change in the predicted probability for each joint trajectory when her educational level moves from non-tertiary degree (which is the zero baseline) to tertiary degree. The confidence intervals (the lines) are calculated using the delta method.^{viii}

[Figure 4a]

Her educational qualification seems to be driving the work hour strategies in parts. If she has obtained a tertiary degree, the couple is less likely to pursue a permanent specialization pattern. Moreover, the probability of trying to pursue a dual career is significantly higher; the he career, she tries full-time pattern is 13.5% more likely to be pursued by a couple in which she has a tertiary degree than in a couple in which her qualification is non-tertiary, which is significant at a .5-level. However, the couple has a lower probability of taking turns.

[Figure 4b]

His higher education does not lead to a lower labour market participation probability of the wife if looked at from a long-term perspective. Instead, his higher education increases her probability to at least try working full-time, although this also is only significant at a .141-level.

It is very likely that not only each partner's absolute but also their relative educational level to one another drives the joint decision-making processes. Hence, in what follows, the couples are distinguished by their joint educational level. The figures can be found in the appendix.

Even when accounting for relative education, her education seems to be the relevant one: If **both partners have no tertiary qualification** (figure A7), there is no significant difference in the probability of work hour patterns pursued in comparison to couples in a *she low, he high* pattern. In contrast, couples in which the woman is the only one with a tertiary degree – *she high, he low* – have a 10.4% lower probability to pursue a permanent specialization pattern, and the contrast is significant at a .07-level. These couples are also 13.2 % more likely to pursue a dual career pattern, although the difference is only significant at a .134-level. This type of couple is also 8% less likely to pursue a taking turns pattern, which is highly significant (at a .000-level). If *both* have a *high* educational qualification, the couples are 15.1 % more likely to try a dual career (which is significant at a 0.071-level). These couples have a 8 % lower predicted probability to pursue a taking turns pattern than the reference couple in which both partners have no tertiary degree.

The difference in the predicted probability is subsequently calculated using a **she low, he high** education couple as the baseline (figure A8). If she has the higher educational qualification (*she high, he low*), the predicted probability of permanent specialization is 14.8% lower – a contrast which is significant at a .05-level. Taking turns is also 8% less likely (significant at a .00-level). Similarly, if *both* have a *high* tertiary degree, taking turns is less likely. Moreover, highly educated couples have a 17.2% higher predicted probability of trying to work full-time at some point, which is significant at a .061-level.

When changing the reference group to a couple in which he has the higher educational qualification (**she high, he low**) (figure A9), there is no significant difference between this couple-type and couples in which *both* have a *high* (tertiary) degree.

5. Limitations

When working with 20 years of data, one has to account for a selective sample (people who respond to all waves may be very different to the average person) while also being able to draw good conclusions in the case of missing data. In longitudinal data analysis, there are a range of different ramifications that missing data can have on the results. To gain a better understanding of how missing data affects the distribution of people across the different trajectories, sensitivity analyses are carried out. The sensitivity analyses test for the effect of right-truncation, left-truncation, and missing values within the observation window.^{ix} Complete case analysis used to be adopted as a means of overcoming the problems arising from missing data. Completeness may be desirable to get a clear picture across time. Yet people who have the time to respond to a survey every year may be very different from those responding only for a couple of years. To test for sample selectivity issues arising from a small number of observations, a further analysis tests whether couples who respond to more than ten waves are different in their work hour trajectories than couples with less than ten observations.

All in all, the sensitivity analyses suggest an under-estimation of non-traditional couple-level patterns. Hence, a conservative technique in relation to the main findings seems to have been chosen. The lower-bound estimate of de-specialization patterns is likely to be even higher in the population. The group-based model from the main analysis can further be interpreted as a sensitivity analysis regarding the researcher-determined trajectory distinctions. Further to the above sensitivity analyses, it should be noted that the study is limited in that if couples dropped out due to unobserved variables, this cannot be discerned in the analysis.^x

Long-term developments are the main interest of this paper. The resulting sample requirement (being observed when the child is 14-20) in turn implies that only couples who stay in a relationship until this point are part of the sample. Hence the results cannot be generalized to divorced couples which may have had a shorter observation period.

Some of the education patterns are likely to be tied to the financial returns from this education. Ideally, one would have tested the relationship between relative financial standing pre-parenthood and subsequent joint work hour trajectories. However, extending the observation window to include pre-parenthood wages leads to a significant drop in the number of sample members (to about a third), which makes an analysis on the 1956-65 cohort infeasible.^{xi}

6. Discussion and Conclusion

The deductive life course approach puts the current interpretation of the comparative advantage theory into question. Against the line of expectation, even with a conservative estimate from the 1956-65 birth cohort, the number of couples who specialized in the long term turns out to be relatively small. A surprisingly small number of couples (21.4%) specialize permanently – a smaller number than economists might expect. The number is also a lot smaller than the 50% in Stier's study on the early childhood years, which underlines the importance of looking at long time-spans. Instead, in a sizable proportion of all couples – 36.4% – she enters full-time employment again. Of the latter, 13.7% try working full-time as mothers. A sizable proportion of women even stays in or returns to full-time employment for good (22.7%). A further 34.2% of couples move into the one career, one job pattern.

The analysis further demonstrates that men also contribute to de-specialization strategies through work hour reductions, even if one does not observe them moving into part-

time employment. 6.7% even take turns in their career investment, supporting US qualitative findings (Becker & Moen, 1999). Reasons for de-specialization may include economic necessity for a dual income, risk avoidance in case of unemployment or divorce, a trading off / taking turns approach or her motivation to make use of the human capital acquired before motherhood. The difference between short-term and long-term work hour investment patterns may further be associated with the costs per child which are likely to increase over time though testing this relationship is up to future research.

The methodological advances in this paper made these findings possible. The main contribution of this analysis therefore lies in its demonstration of how the use of high quality prospective household panel data, which in recent years spans decades of couples' lives, can enhance our understanding of how couples' career trajectories are linked across the life course. The analytical possibilities are now greatly extended by the panel data's provision of a continuous rather than categorical measurement of working hours. It enables researchers to work with a life course dual trajectory approach, which allows the uncovering of formerly hidden couple-level and long-term dynamics. Rather than just taking snap-shots of particular transitions or shorter time-spans, it sheds light on what happens between these transitions from part-time to full-time employment. Furthermore, it reveals how couples' working hours evolve in relation to one another, even if neither of the partners ever leaves full-time or part-time employment. By shifting the focus from what happens around the birth of the oldest child to what changes when the youngest child grows up and leaves home, this paper explicitly tests whether specialization is indeed a long-term pattern. The paper thereby directly addresses the appeal to bring the life course back into life course research and to link lives (Aisenbrey & Fasang, 2010; Bianchi & Milkie, 2010). There is considerable heterogeneity in couples' degrees of specialization, further underscoring the importance of

moving away from analysing the average couple to analysing variations in the division of labour.

The joint work hour trajectories seem to be tied to her rather than his human capital investments made before entering parenthood. Unlike Blossfeld et al's findings which are based on analysing her transition from housework to full-time employment, the woman's educational level makes a significant difference as to whether dual full-time employment is pursued when the life course trajectory is analysed (Blossfeld, et al., 2001). Women with high educational qualifications are not only less likely to permanently specialize, but are also significantly more likely to try working full-time. This difference between working part-time and trying to work full-time could not be captured in past analyses, which only looked at the first transition after childbirth (from housework to part-time employment). In contrast, his educational level has no significant effect. A similar strategy may be less economically viable for less educated women as the returns on investment are likely to be lower in the long term and hence the opportunity costs for staying at home are lower.

Further interesting differences emerge from looking at the couple's **combined education**:

Assuming that on average there is a positive relationship between educational level and salary, if a *man's qualification is lower than hers*, her comparative advantage on the labour market might result in a higher contribution. The data is inconsistent with this assumption with about 31.5% pursuing a dual career or eventually pursuing a dual career, as compared to 17.2% when they have the same non-tertiary education. Couples are also significantly less likely to permanently specialize both in comparison to couples in which both have the same non-tertiary education and in comparison to couples in which he has the comparative advantage. Moreover, these couples are significantly more likely to pursue a

dual career when compared to a couple in which both have the same low educational qualification. Interestingly, there is no significant difference from couples in which both have a tertiary degree. This suggests that, again, as with the individual-level results, the woman's rather than the man's educational level is the main driver for joint work hour patterns.

This is also reflected in the fact that *his comparative advantage* makes no significant difference when compared to a couple in which both have a low education. Only compared to couples in which both have a tertiary degree, couples where his education is higher than hers are less likely to try working full-time – possibly because of a lack of economic incentive if his education (and probably salary) is higher than hers.

Moreover, if *both have a tertiary degree* the couple is significantly more likely to try and pursue a dual career than if both partners have a low education. This may be a reflection of these couples' ability to support a dual career by outsourcing housework and childcare in a setting with low institutional support. A high income has been found to be related to higher outsourcing in the past (Cohen, 1998). The costs associated with having a child are likely to differ between low and high educated parents once the child enters its late teens. Past studies have shown that there is a correlation between parental and children's education (Riphahn & Trübswetter, 2013). Children of low educated parents are consequently more likely to attend Berufsschulen (vocational training schools). From the age of 16 these children will generally receive a salary as they will work for an employer. In contrast, highly educated parents are more likely to have children who pursue higher degrees as well. Parents who send their children to university would have to financially take care of their children for another three years so they could complete their high school degree. Thereafter, unless the family had an income below the educational subsidy threshold (BAföG), parents would have to pay for their child's rent and food (unless children work and study at the same time). Women may

consequently be more likely to re-enter high levels of employment in order to meet the family's higher financial needs when the child grows up. Women in low educated couples may in contrast face less financial strain, as their children will earn their own salaries considerably earlier in their lives.

The non-significant differences are interesting in themselves. The probability of specialization does not differ significantly between couples in which *both have a high educational* qualification when compared to a couple in which both partners' education is low. Neither does the probability of pursuing a he career, she job strategy. Similarly, results do not differ significantly when compared to couples in which he or she holds the comparative advantage.

One can conclude from this finding that women seem to have different levels of ambition in this group. On the one hand, it can be argued that her education represents a pre-motherhood human capital investment which the woman or her partner may be unwilling to relinquish. A possible explanation is that the female partner may be pursuing a career for its own sake. The career achievement rather than the financial rewards may drive her career investment choices. The woman might want to prove herself vis-à-vis her partner. Alternatively, she may want to lower the individual-level financial risk of divorce or the couple-level risk of his unemployment. Whether this re-investment is driven by her desire to pursue a career or by the desire to reduce the individual-level risk of divorce or the couple-level risk of unemployment is unclear.

On the other hand, despite higher opportunity costs, some women with a tertiary degree choose not to pursue a dual career. The family's material wants may be completely satisfied by a single (male) income. Rather than further increasing the family's income, women may then have the choice to work fewer hours, thereby creating a potentially better

work-life balance for the family. Furthermore, the “vocation” may lie in an occupation which does not require a full-time work hour investment, e.g. if she deliberately turns down a job as a prominent lawyer in a firm that represents the tobacco industry and instead opts to contribute to society by doing pro-bono work defending the poor. Alternatively, women may feel pressured by a conservative environment to avoid being a “Rabenmutter” (“bad/greedy/raven mother”). This might also explain why 32.8% of women tried working full-time but eventually refrained from doing so.

In summary, even though economic arguments would largely lead one to assume that specialization in the division of labour is to be expected, this is not supported in a life course analysis. Even with an estimate which is likely to be a conservative estimate of de-specialization from the West German 1956-65 birth cohort subject to traditional socialization, this notion has to be rejected. Couples seem to move back into dual employment of varying degrees as soon as they are able to, particularly if she is highly educated. For most of the highly educated women this is likely to reflect an intrinsic motivation to work or a risk-avoidance strategy in case of the partner’s unemployment or divorce. The close linkage between women’s working hours and institutional support (with many women reaching their work hour plateau only when the child is in its teens) suggests that the recent policies aimed at full childcare coverage also for young children, both in terms of number of children and hours throughout the day, are likely to lead to an increase in dual careers or eventual dual careers. Further analysis will show how a more supportive attitudinal and institutional environment both across time and space may lead to different distributions in joint work hour trajectories. If the latter leads to an increase in employment at the age at which coverage is extended, this would suggest that divisions of public policy rather than the economist’s notion of divisions of labour are at work across the life course.

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Notes

ⁱ The data used in this publication were made available to me by the German Socio-Economic Panel Study (SOEP) at the German Institute for Economic Research (DIW), Berlin.

ⁱⁱ There are further twists to this theory but this is how it is most commonly used in the research.

ⁱⁱⁱ Recent press speculation in the Stern suggests that children indeed cost more across the life course (Boldebuck & Harberg, 2014). Analysing the relationship between a child's age and the costs associated with the child is up to future scientific work.

^{iv} Education may of course have other values other than purely economic ones. Education may make you want to participate in a more varied range of experiences, which you may find in the labour market. A slightly anti-feminist approach might also say that women value education for a different reason (its intrinsic value) than men do. Still, this does not affect the lower-bound estimate.

^v Only West German couples are analysed as East and West Germany differ in their values and institutional support, which has led to different work hour strategies (see Steiber & Haas 2010).

^{vi} The reason behind preferring the researcher over the data driven approach in the main analysis is that group-based trajectory analysis is an approximation to the data and as such it cannot discern certain patterns, e.g. whether she tried working full-time might be classified as her working part-time throughout because most data points lie on this curve. Moreover, for this paper the interest also lies in the relationship between couples, e.g. whether partners take turns. The group-based model groups about 70% into a trajectory which suggests that men's working hours are stable when in fact some of these men also decrease their hours. With a smaller sample size and more missing data points, a group-based trajectory analysis may have been preferred. As the sample size allows for a large enough number of observations to draw the trajectories of each couple directly, a researcher-driven determination of work hour patterns is chosen instead.

^{vii} A multinomial regression was chosen as there is no obvious ordering among the joint education categories. One cannot assume that there is a transitive relationship, so that if "She High, He Low" > "She Low, He High" and "She Low, He High" > "Both High," that the relationship "She High, He Low" > "Both High" also holds.

^{viii} Please refer to Long, J. S. (1997). *Regression models for categorical and limited dependent variables*. Sage. for further details and to Jann, B. (2013). COEFPLOT: Stata module to plot regression coefficients and other results, *Statistical Software Components*, (2014). From *University of Bern Social Sciences Working Paper No. 1*: University of Bern, Department of Social Sciences for the coefplot module producing the graph.

^{ix} For this particular analysis no weights are used in order to ensure that differential group attribution is down to the truncation rather than different weights.

^x Please refer to the appendix for further information.

^{xi} Controlling for various independent variables within a multinomial specification is beyond the scope of this paper but it is an interesting potential line for future research.

Appendix:

1.1. Validating the Deductive Trajectory Groups with an Inductive Approach

A group-based trajectory model was run to test whether the same dominant patterns emerge from the data. Group-based trajectory modelling lets statistical criteria such as the BIC, and hence the data, determine the number and the shapes of different groups. Whilst some of the decisions are still made by the researcher, it is in essence a more inductive approach than the one applied in the main paper. It differs from a multilevel model in its assumptions: the multilevel approach assumes that “the population distribution of trajectories varies continuously across individuals and in a fashion that can be ultimately explained by a multivariate normal distribution of population parameters” (Nagin, 2005: 5). In contrast, the group-based trajectory model “assumes that there may be clusters or groupings of distinctive developmental trajectories that themselves may reflect distinctive etiologies” (Nagin, 2005: 5).

For the group-based trajectory model of this paper, the number and shape of trajectories is allowed to be different for men and women. The results are weighted by the last observation’s longitudinal weight to account for differential sampling and differential drop-out probabilities. These are calculated by multiplying the first year cross-sectional weight with the probability of staying in the sample in the following waves until the final observation (see SOEP Desktop Companion for further details (Haisken-DeNew & Frick, 2005)). The model choice both for the number of groups and for the shape of each trajectory group is based on the best joint Bayesian Information Criterion and on the statistical significance of the polynomials.

The group-based trajectory model's accuracy is tested both by calculating the confidence intervals and by looking at the average posterior probability of assignment (Nagin, 2005, ch.5).

1.2. Results of the Inductive Approach

The best-fitting group-based trajectory analysis seems to support the ideal-type distinctions of the main text. Note that there are slight fluctuations around these patterns so that the trajectories represent trends rather than absolute patterns.^{xii}

Moreover, the results already provide an indication of the main patterns. Working below fifteen hours or being a housewife seems not to be the overall dominant work hour pattern in the long term. Rather, part-time employment seems to emerge as one of the main work hour trajectories. Approximately 20% of women are predicted to follow a trajectory which includes periods of full-time employment.

[Figure A1]

Like the main analysis, the results further point toward the importance of the child's institutional whereabouts: on average, the early full-timers and the early part-timers increase around the age of three whilst other women increase their hours when the child is of primary school age (six years old). The maximum hours are reached only once the child has entered secondary school (which it enters either at age 10 or 12 depending on the Bundesland).

Unlike women, who differ in their initial work-hour intercepts after childbirth, men's working hours generally start off high (see figure A2). Subsequently, they seem to stay fairly stable or increase from there onwards. Just around 10% reduce their hours on average at some point. Interestingly, his work hour pattern does not seem to be closely tied to the age of the youngest child.

[Figure A2]

2. Missing Data

This section provides further details regarding the sensitivity analysis mentioned in section five of the article. The sensitivity analysis is carried out for the dyadic index from figure 1b (His share in joint working hours). The rationale for choosing this variable for the test is that it provides a more parsimonious summary of whether de-specialization or specialization occurs at various observation lengths. The dual trajectory approach would have resulted in too many possible combinations of his and her trajectories, making a comparison less intuitive.

The sample is chosen based on the observed relative hours. If they are missing, the individual-year is set to missing. The truncation is tested on a 15-year balanced panel as the 20-year balanced panel covers only 71 observations as opposed to 132 couples. The 71 couple-sample would have resulted in a cruder comparison. Balance is defined by the item-response rather than the individual having filled in the survey, but possibly not the item in that year.

For the dyadic index, the area above the 60% line is an area in which the couple has not reached a non-traditional division of labour, whilst the area below is deemed to be traditional. Couples are classified as traditional, traditional moving (if they move toward but do not cross the 60%-line), traditional to non-traditional (if they cross the 60% line) and non-traditional (moving around the 60 % line or below). The first category is a specialized couple-type whilst the latter categories represent various degrees of non- or de-specialization. Note that the 60% cut-off point is data-determined, as very few couples have a 50% distribution in the approximation.

2.1. Right-Truncation

As a first step, I would like to see how truncating the 15-year fully balanced sample to the first seven, ten and twelve years of the youngest child's life affects the assignment of individuals to groups. I use an unweighted group-based trajectory model (data-driven categorization) to see which dominant patterns emerge from the various samples. Weighting would have made it less clear whether the patterns emerged due to a different longitudinal weight or because of a different pattern being identified. The number of trajectories is determined by the best Bayesian Information Criterion (see Nagin, 2005). A quartic polynomial specification is chosen for each trajectory group to ensure a high flexibility in the patterns. Under this specification, a seven-group model has the best fit. The specification is kept throughout to ensure that different patterns do not emerge due to a change in specification. Subsequent to each type of truncation, the assigned group is saved to compare the group assignment of the same individual across different types of right-truncation.

When all values are observed across the fifteen years (figure A3a), approximately 18.9% of all couples are categorized as traditional. The rest de-specializes across the life course.

Several observations can be made about figure A3b when the same sample of the previous figure a is only observed for twelve years. First, more couples are categorized as pursuing a traditional division of labour (37.6% vs. 18.9%). Second, fewer couples are categorized as pursuing a non-traditional division of labour (3% vs. 13.7%). Third, the traditional to non-traditional groups 3 and 5 are smaller and most of the couples barely cross the 60% line when the sample is truncated.

When truncated at seven years, the same individuals are again classified as traditional in 37.2 % of the cases. The non-traditional group drops further to 2.3 %. The group which moves from traditional to a non-traditional division of labour decreases from 15% to 1.5%.

When comparing the same individuals' categories derived from 15 years and 7 years of data, it becomes clear that, with 15 years of data, an individual would have been classified as pursuing a traditional pattern, while the same individual observed for only seven years would have been classified as less traditional in only 3 of the 70 reclassified cases. Overall, the findings underscore the importance of working with the longest observation window possible. Hence the choice to observe all couples at least once when the child is aged between 15 to 20 years in the main analysis. Nevertheless, as not all couples will have reached the 20 years, over-estimation of traditional patterns is likely in case of right-truncation.

[Figure A3]

2.2. Left-Truncation

Figure A4 shows that left truncation (3 and 7 years) again increases the number of couples who are categorized as following a traditional work hour pattern from 18.9% to 21%. Moreover, only 3% as opposed to 13.7% of the sample is categorized as following a non-traditional work arrangement. Fewer couples are categorized as moving from traditional to a non-traditional division of labour (i.e. him working less than 60% of the joint working hours). The number drops from 20.4% in figure A4a group 4 to 3% in figure A4c group 2.

When comparing the same individuals when observed for 15 years and when missing the first 7 years, it becomes apparent that in the truncated case, the same individual would have been classified as more traditional in all of the 40 reclassified cases. Again, left-truncation leads to an overestimation rather than underestimation of the traditional patterns.

[Figure A4]

2.3. Uneven Spacing

Subsequently, the effect of uneven spacing of observations is analysed. The data is artificially set to missing and includes only an observation at age 2, 4, 9, 12, 15.

[Figure A5]

Again, the always traditional group is larger than in the fully balanced sample (24.8% vs. 18.9%) and the non-traditional group is smaller (4.5% vs. 13.7%). Furthermore, fewer couples cross the 60% line.

Overall results suggest that right-truncation, left-truncation, and missing data leads to an over-estimation of the number of traditional couples. Consequently, the missing data analysis indicates that the chosen non-balanced sample seems to provide a lower-bound estimate of de-specialization.

3. Selection Effects

In the case of working hours, it is highly likely that people who respond to the survey every year may work less than people who do not manage to respond in every wave. Consequently, a multilevel analysis comparing the work hour trajectories of women with different response patterns is carried out.

[Figure A6]

This model demonstrates that women with up to ten responses worked more hours throughout the first 20 years of the youngest child's life than women with a higher number of responses. Because everyone within the sample has at least responded to six waves and 50% to 19 times or more, her working hours are likely to be underestimated across the life course.

All in all, the sensitivity analyses suggest an underestimation of non-traditional couple-level patterns. Hence, a conservative technique in relation to the main findings has been chosen. The lower-bound estimate of de-specialization patterns is very likely to be even higher in the population.

4. The Relationship between Joint Educational Levels and Joint Work Hour Trajectories

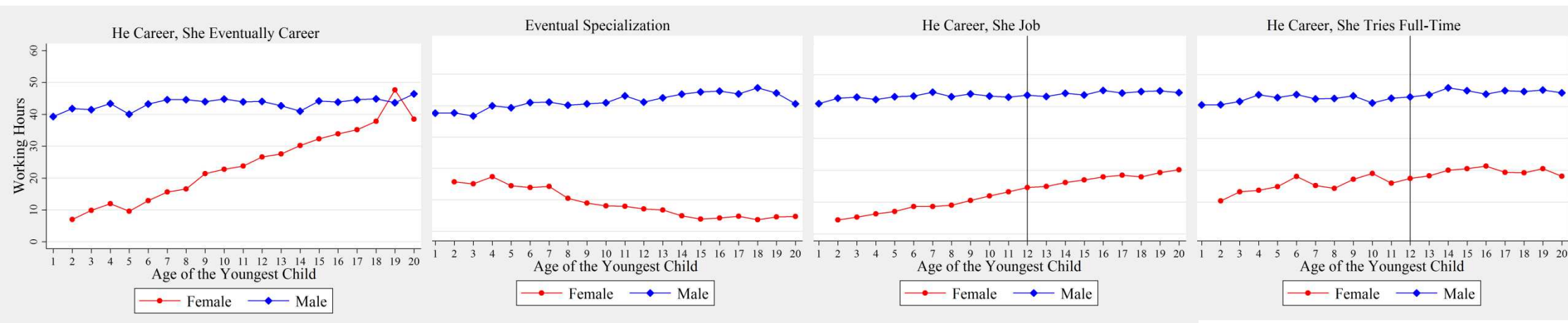
[Figure A7]

[Figure A8]

[Figure A9]

^{xii} The figures were created using the trajplot command (see Nagin 2005)

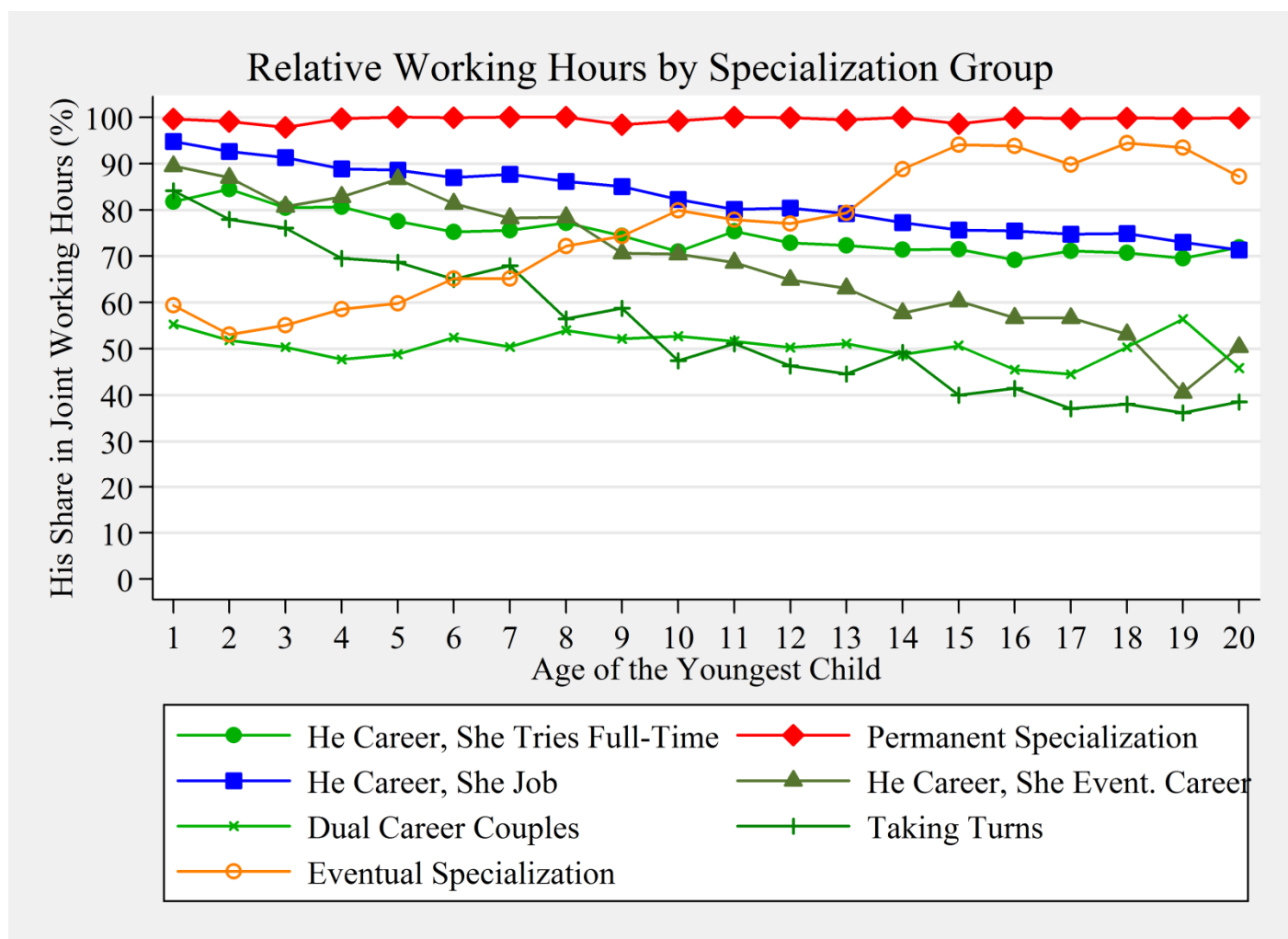
Figure 1a: Couples' Absolute Work Hour Strategies by the Youngest Child's Life-Course, Dyadic Growth-Curves (Researcher-Determined / Deductive Groups)



Note: The two curves are jointly estimated with a discrete time specification. Maximum likelihood estimation is used. Time is nested within the couple.

Source: author's own calculations based on GSOEP v28, semi-balanced panel of parents of the 1956-65 West German female birth cohort who are observed at least once during first four years and once at age 5-13 and once at age 14-20, excluding "others". Unweighted N = 460.

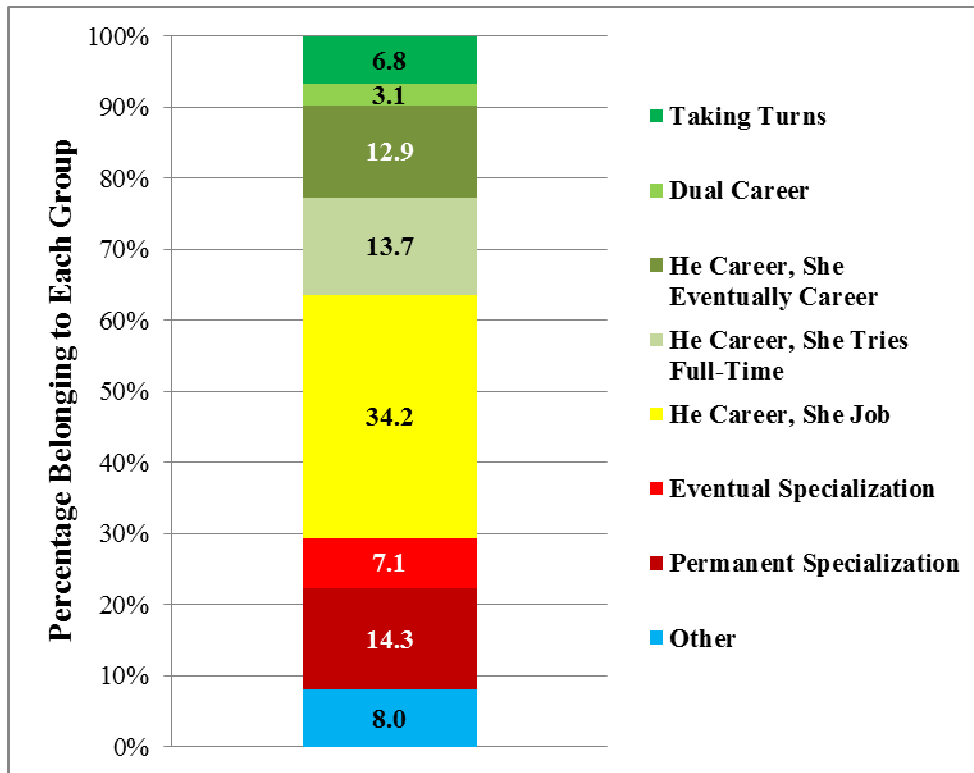
Figure 1b: Couples' Relative Work Hour Patterns by the Youngest Child's Life-Course, Dyadic Index Growth-Curve Model (Researcher-Determined / Deductive Groups)



Note: The two curves are jointly estimated with a discrete time specification. Maximum likelihood estimation is used. Time is nested within the couple.

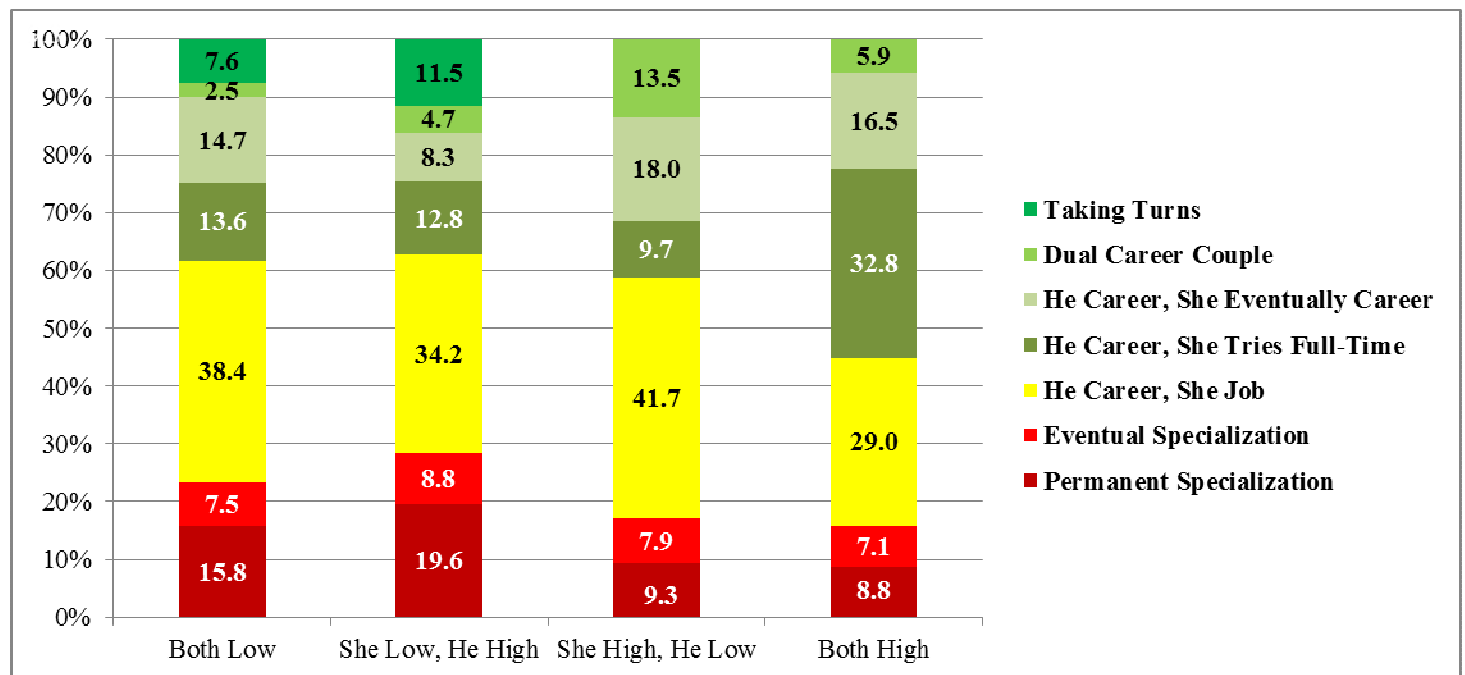
Source: author's own calculations based on GSOEP v28, semi-balanced panel of parents of the 1956-65 West German female birth cohort who are observed at least once during first four and once at age 5-13 and once at age 14-20, excluding "others". Unweighted N = 460.

Figure 2: Distribution of Couples' Joint Work Hour Strategies (1a/b)



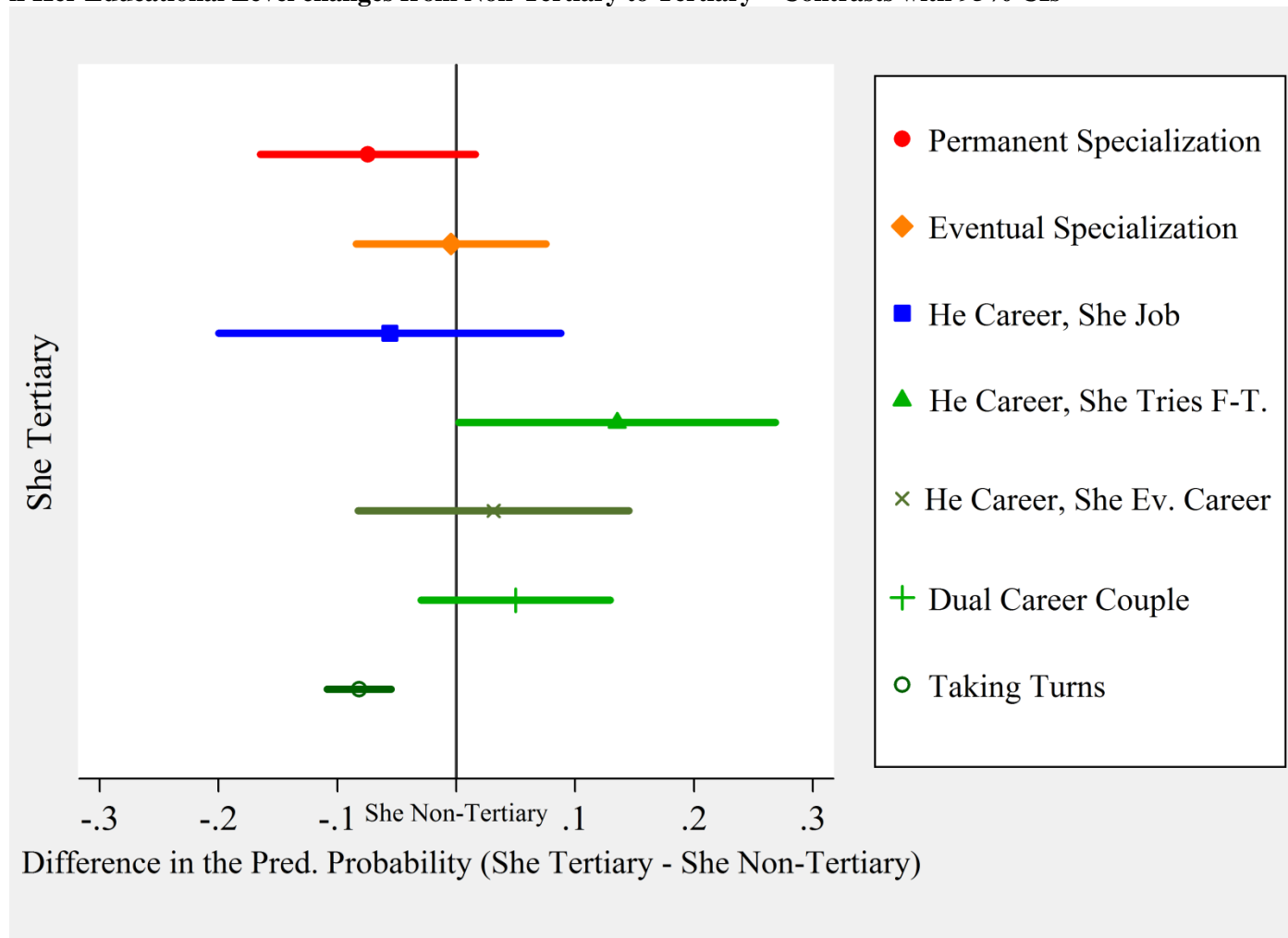
Source: author's own calculations based on GSOEP v28, semi-balanced panel of parents of the 1956-65 West German female birth cohort who are observed at least once during first four years and once at age 5-13 and once at age 14-20. Groups are derived from the researcher-determined couples' joint work hour trajectory shapes depicted in figure 1a. The results are weighted by the last observation's longitudinal weight. Unweighted N = 505.

Figure 3: Joint Work Hour Trajectories by Joint Education



Source: GSOEP v28, semi-balanced panel of parents of the 1956-65 West German female birth cohort who are observed at least once during first four years and once at age 5-13 and once at age 14-20. Groups are derived from the researcher-determined couples' joint work hour trajectory shapes depicted in figure 1a, excluding "others". The results are weighted by the last observation's longitudinal weight. Unweighted N = 460.

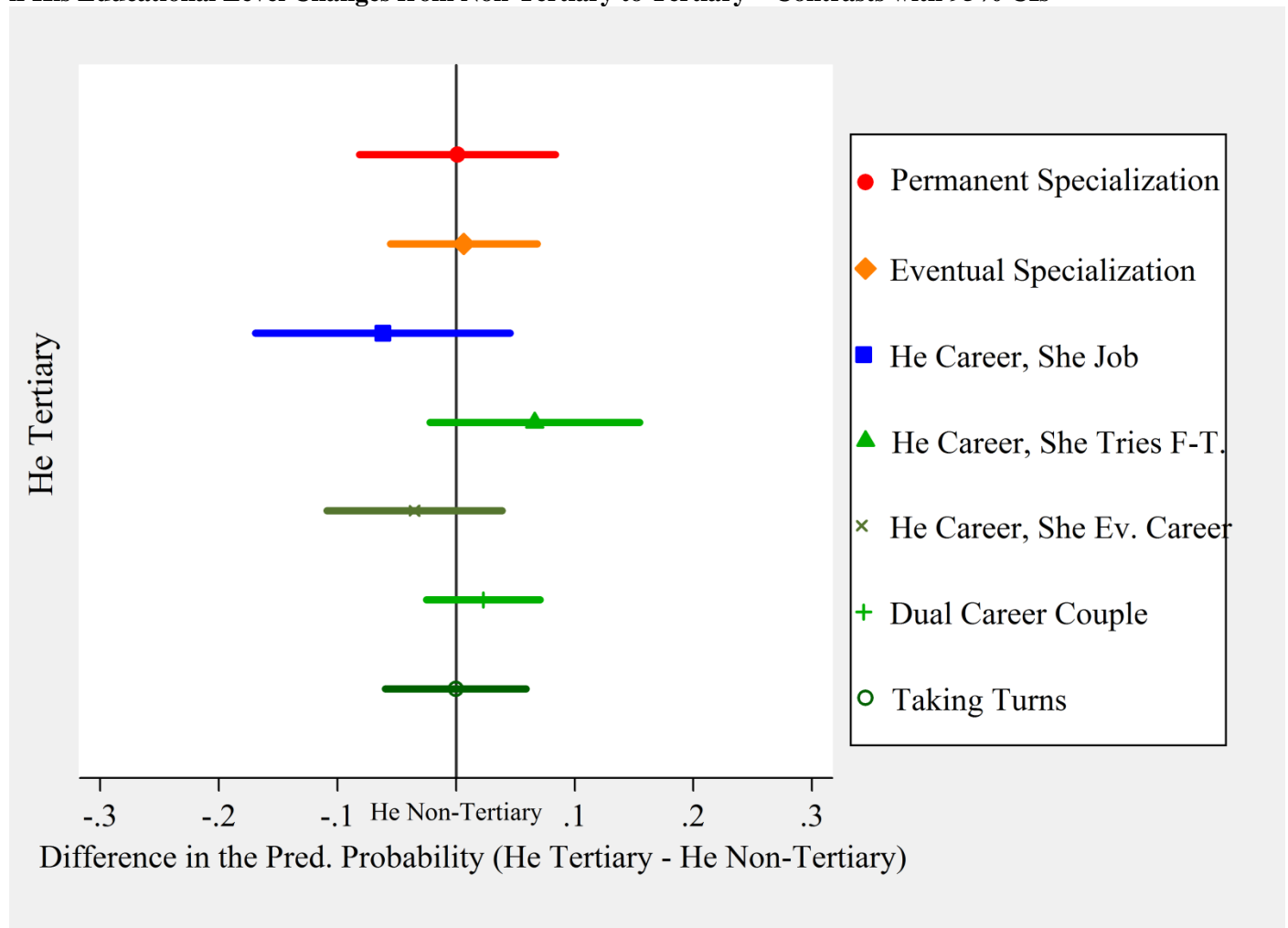
Figure 4a: Change in the Predicted Probability of the Joint Work Hour Trajectory if Her Educational Level changes from Non-Tertiary to Tertiary – Contrasts with 95% CIs



Note: To be read as e.g. female tertiary degree holder couple has a 7.4 % lower probability to pursue permanent specialization than the baseline couple in which she holds no tertiary degree. For the figures discrete changes (i.e. differences in the predicted probabilities) are calculated based on a multinomial logistic regression. The empty cells are reweighted. The results are further weighted by the last observation's longitudinal weight.

Source: GSOEP v28, semi-balanced panel of couples observed across the youngest child's life-course (once when aged 1-4, once at age 5-13 and once at age 14+). Groups are derived from the researcher-determined couples' joint work hour trajectory shapes depicted in figure 1a, excluding "others". Unweighted N = 460.

Figure 4b: Change in the Predicted Probability of the Joint Work Hour Trajectory if His Educational Level Changes from Non-Tertiary to Tertiary – Contrasts with 95% CIs

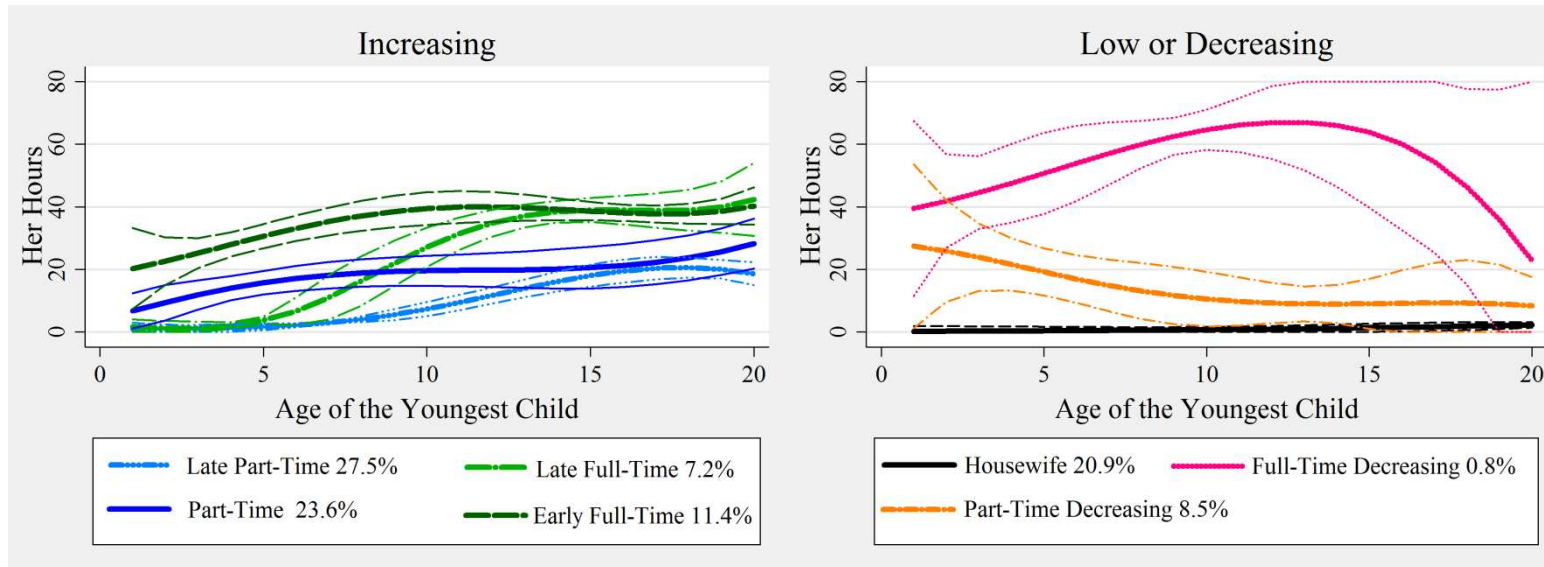


Note: For the figures discrete changes (i.e. differences in the predicted probabilities) are calculated based on a multinomial logistic regression. The empty cells are reweighted. The results are further weighted by the last observation's longitudinal weight.

Source: GSOEP v28, semi-balanced panel of couples observed across the youngest child's life-course (once when aged 1-4, once at age 5-13 and once at age 14+). Groups are derived from the researcher-determined couples' joint work hour trajectory shapes depicted in figure 1a, excluding "others". Unweighted N = 460.

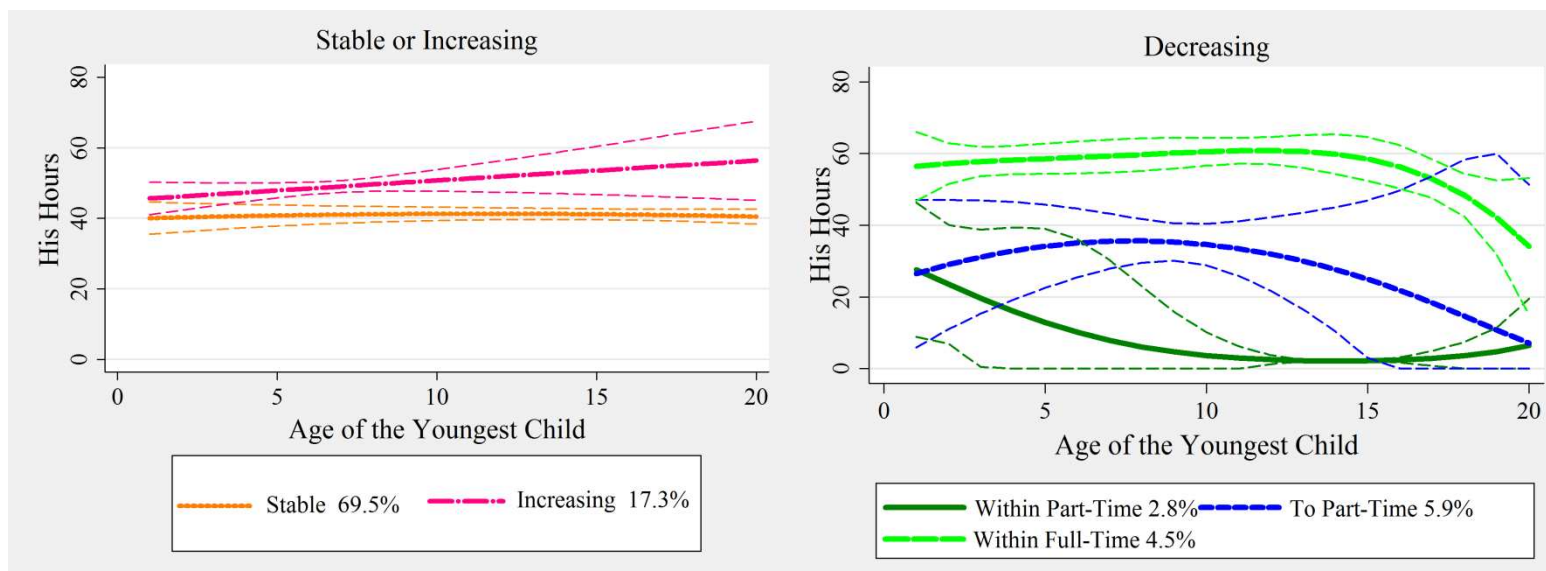
APPENDIX FIGURES

Figure A1: Women's Work Hour Trajectories Along the Youngest Child's Life Course, Group-Based Trajectory Model (Data-Based / Inductive Approach) With Confidence Intervals



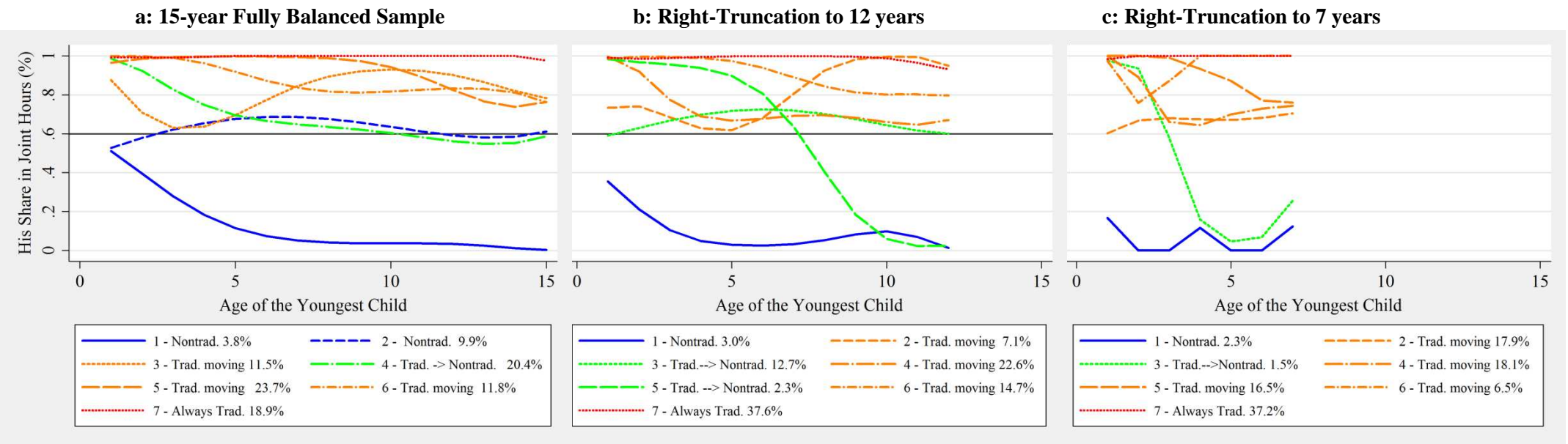
Source: author's own calculations based on GSOEP v28, semi-balanced panel of West German partnered mothers born between 1956-65 who are observed at least once during first four years and once at age 5-13 and once at age 14-20, weighted by final-observation longitudinal weight. Unweighted N = 505.

Figure A2: Men's Work Hour Trajectories across the Youngest Child's Life Course, Group-Based Trajectory Model (Data-Based Approach) with Confidence Intervals



Source: author's own calculations based on GSOEP v28, semi-balanced panel of fathers partnered to 1956-65 West German women who are observed at least once during first four years and once at age 5-13 and once at age 14-20, weighted by final-observation longitudinal weight. Unweighted N=505.

Figure A3: Dyadic Index Trajectory Patterns – Right Truncation



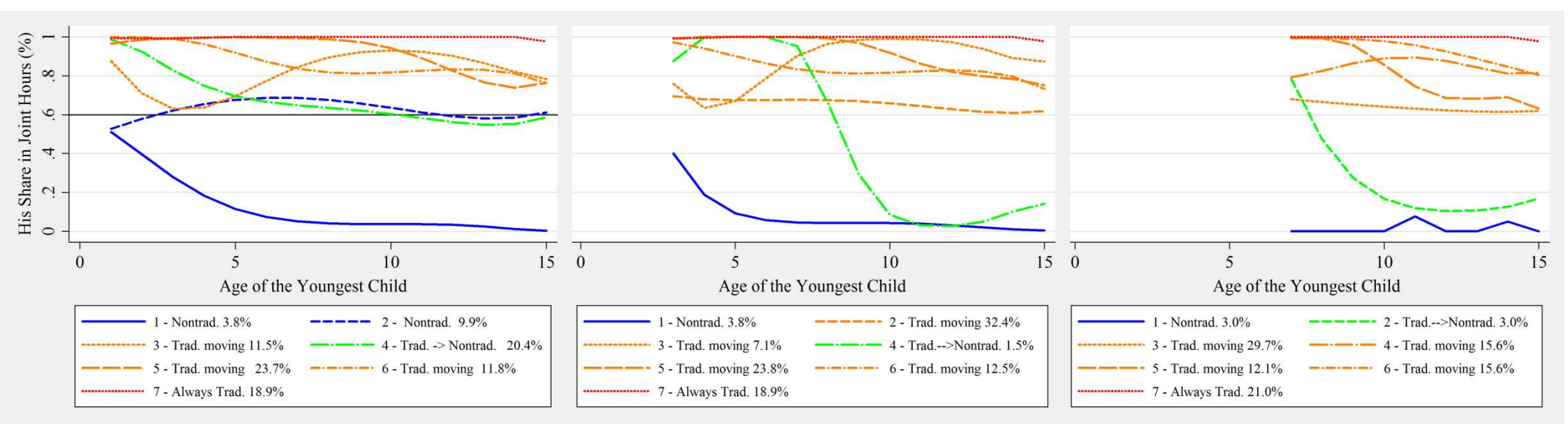
Source: author's own calculations based on GSOEP v28 all West German parents of the 1956-65 female birth cohort who jointly responded to the work hour question when the child was aged 1-15 without any missing values. Unweighted N =132.

Figure A4: Dyadic Index Patterns – Left-Truncation: Group-Based Trajectory Analysis

a: 15-year Fully Balanced Sample

b: Left-Truncation to 3 years

c: Left-Truncation to 7 years

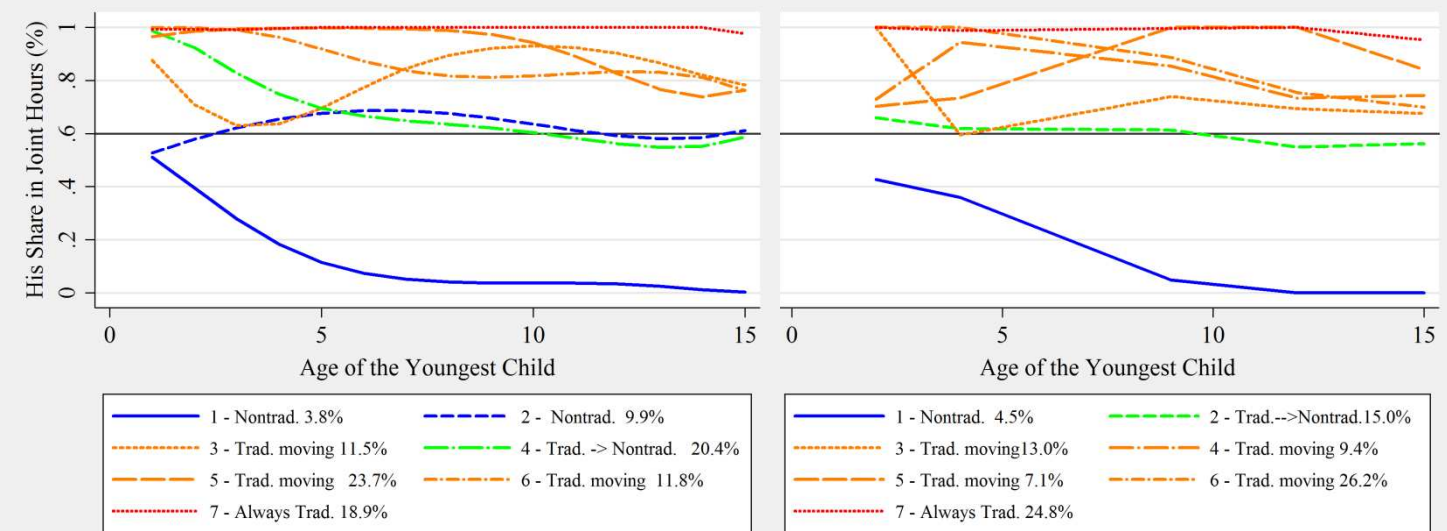


Source: author's own calculations based on GSOEP v28 all West German parents of the 1956-65 female birth cohort who jointly responded to the work hour question when the child was aged 1-15 without any missing values. Unweighted N=132.

Figure A5 Dyadic Index Patterns - Uneven Spacing: Group-Based Trajectory Analysis

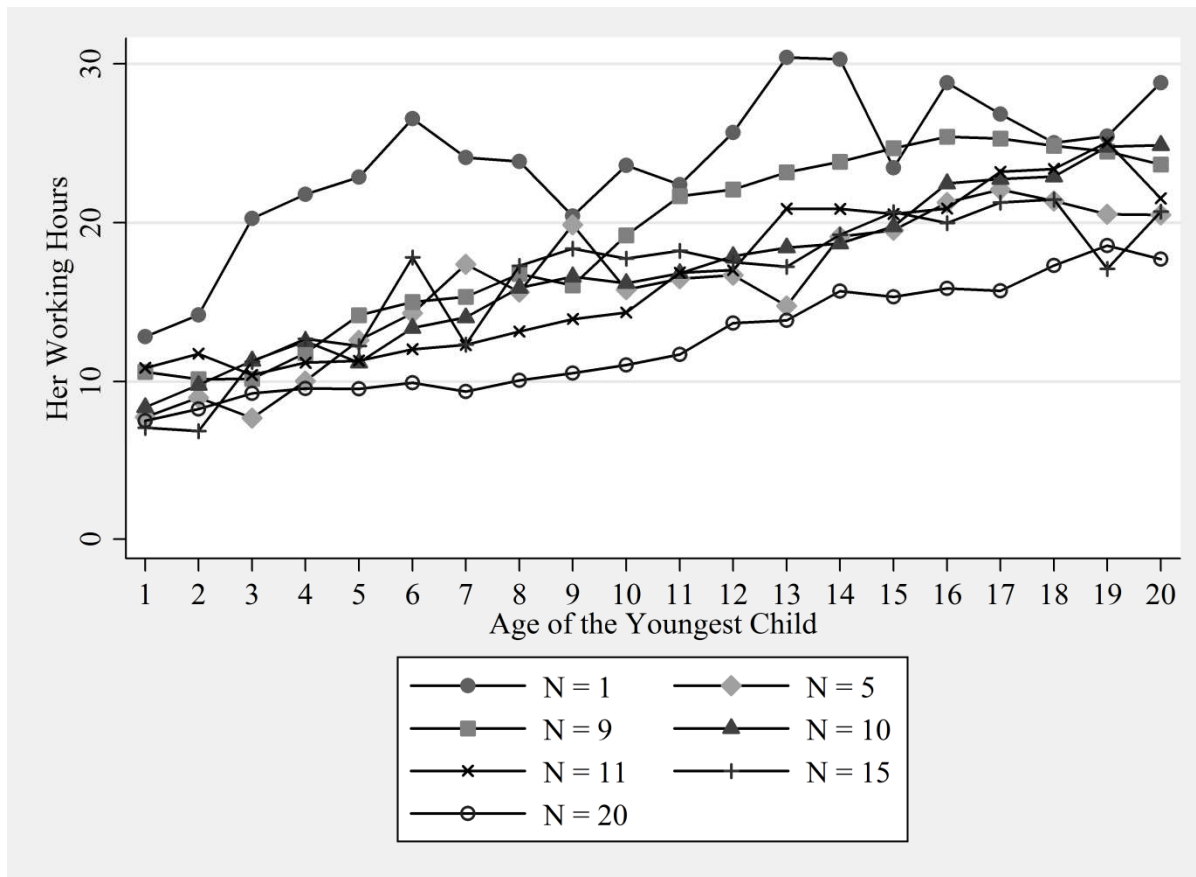
a: Complete Data

b: Data for ages 2,4,9,12 & 15



Source: author's own calculations based on GSOEP v28 all West German parents of the 1956-65 female birth cohort who jointly responded to the work hour question when the child was aged 1-15 without any missing values. Unweighted N =132.

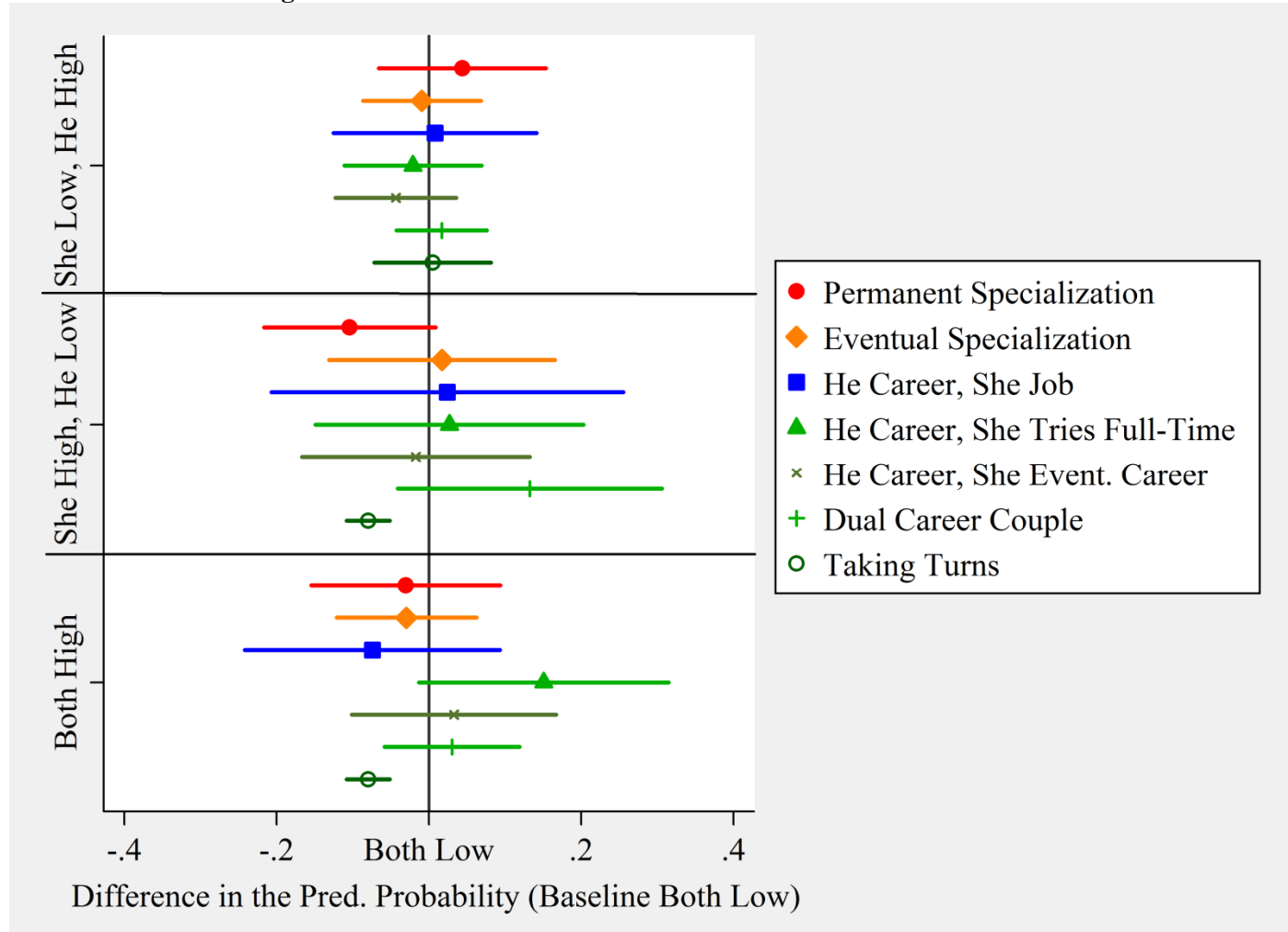
Figure A6: Her Working Hours by Number of Survey Responses: Growth-Curve Analysis



Note: Time-points are nested within individuals. The fixed part uses a discrete specification of time interacted with the group to account for differential developments. A random effect for the child's age is used. The multilevel model uses maximum likelihood estimation and an unstructured covariance matrix.

Source: author's own calculations based on GSOEP v28, West German coupled women belonging to the 1956-65 birth cohort. Unweighted N = 1754.

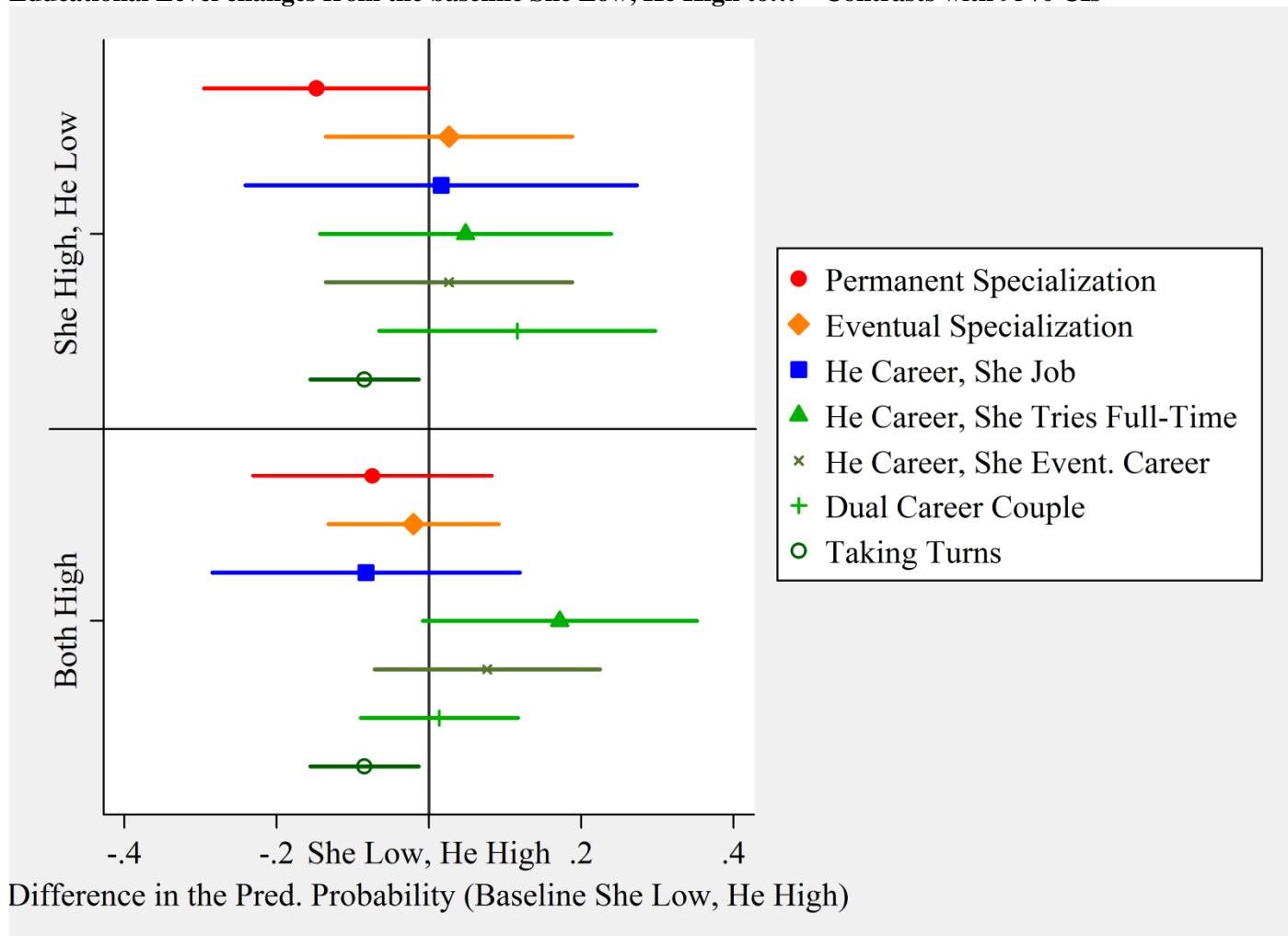
Figure A7: Couple's Change in the Predicted Probability of the Joint Work Hour Trajectories if Joint Educational Level changes from the baseline Both Low to... – Contrasts with 95% CIs



Note: To be read as e.g. she high, he low degree holder couples have a 10.4 % lower probability to pursue permanent specialization than the baseline couple in which both have no tertiary degree. For the figures discrete changes (i.e. differences in the predicted probabilities) are calculated based on a multinomial logistic regression. The empty cells are reweighted. The results are further weighted by the last observation's longitudinal weight.

Source: GSOEP v28, semi-balanced panel of couples observed across the youngest child's life-course (once when aged 1-4, once at age 5-13 and once at age 14+). Groups are derived from the researcher-determined couples' joint work hour trajectory shapes depicted in figure 1a, excluding "others". Unweighted N = 460.

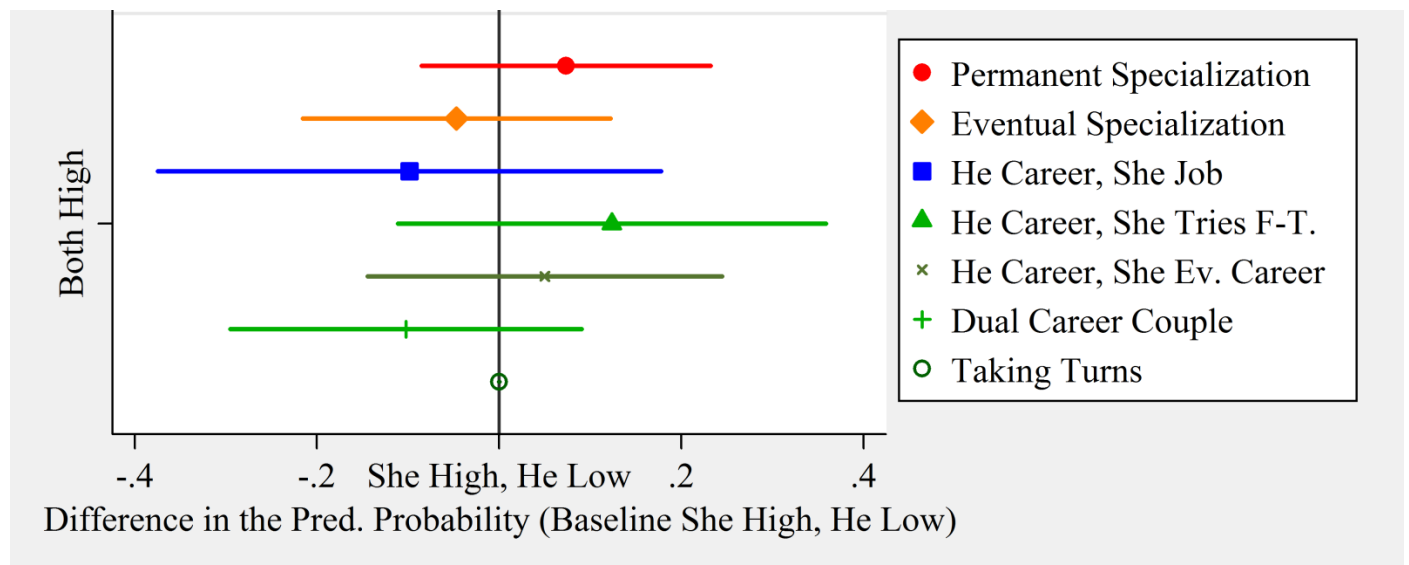
Figure A8: Couple's Change in the Predicted Probability of the Joint Work Hour Trajectories if Joint Educational Level changes from the baseline She Low, He High to... – Contrasts with 95% CIs



Note: For the figures discrete changes (i.e. differences in the predicted probabilities) are calculated based on a multinomial logistic regression. The empty cells are reweighted. The results are further weighted by the last observation's longitudinal weight.

Source: GSOEP v28, semi-balanced panel of couples observed across the youngest child's life-course (once when aged 1-4, once at age 5-13 and once at age 14+). Groups are derived from the researcher-determined couples' joint work hour trajectory shapes depicted in figure 1a, excluding "others". Unweighted N = 460.

Figure A9: Couple's Change in the Predicted Probability of the Joint Work Hour Trajectories if Joint Educational Level changes from the baseline She High, He Low to Both High – Contrasts with 95% CIs



Note: For the figures discrete changes (i.e. differences in the predicted probabilities) are calculated based on a multinomial logistic regression. The empty cells are reweighted. The results are further weighted by the last observation's longitudinal weight.

Source: GSOEP v28, semi-balanced panel of couples. Groups are derived from the researcher-determined couples' joint work hour trajectory shapes depicted in figure 1a. Couples are observed across the youngest child's life-course (once when aged 1-4, once at ages 5-13 and once at ages 14+). Unweighted N = 460.