



# INCOME COMPARISON AND HAPPINESS WITHIN HOUSEHOLDS

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# Income Comparison and Happiness within Households

Jan Salland

## Zusammenfassung / Abstract

This paper applies the German Socio-Economic Panel to analyse the effect of within household income comparison on individual life satisfaction. Our estimates indicate, a primary breadwinner wife decreases spousal individual happiness by roughly nine per cent. To state the economic significance, a €70,000 increase in external, peer reference income corresponds to a similar individual happiness decrease. The estimates suggest envy effects among couples and provide mixed evidence for gender roles to influence subjective well-being. Based on subsample estimations, our results are driven by younger birth year quartiles, lower education and total income households, East German couples and households with greater fulltime employment share. The paper adds to within household interdependence of subjective well-being and indicates negative consequences of couple income comparison for individual happiness. Wives (barely) outearning their husbands seem to signal 'competition'.

**Schlagworte / Keywords:** Life Satisfaction, Well-being, Happiness, Income Comparison, Gender Identity

**JEL-Klassifikation / JEL-Classification:** D10, I31, J16

## 1. Introduction

Striving for happiness can be regarded a central objective in life; essentially everybody seeks happiness. Why is happiness research relevant to economists? Frey and Stutzer (2002) name three reasons: 1) economic policy should consider its net effect on individual utility, 2) an economies' institutional condition impacts individual well-being and 3) happiness research adds to existing economic theory on subjective well-being (SWB)<sup>1</sup> formation among individuals (Loewenstein et al., 2003).

Is income relevant in happiness research and does (more) income buy happiness? As formulated by utility theory, an increase in income allows the individual to reach a higher indifference curve. However, the empirical evidence on the link between absolute income and happiness remains mixed. Several studies find a positive relationship between income and happiness (Clark et al., 2001; Frey and Stutzer, 2000; Gerlach and Stephan, 1996; Winkelmann and Winkelmann, 1998), while Clark and Oswald (1994) do not find a robust effect.

Based on post WWII cross-country evidence, a rise in real income does not per se increase well-being (Frey and Stutzer, 2002). The relationship between income and happiness is rather captured by a marginal utility decreases with an increase in absolute income. An empirical reason is preference interdependence (Duesenberry, 1949; Pollak, 1976; Van de Stadt et al., 1985 and Kapteyn et al., 1997), i.e. individuals compare income changes to personal income reference points or peers outside the household. Neumark and Postlewaite (1998) analyse social comparison and relative income within the family. The authors find a woman's decision to seek employment to depend on her sisters' and sisters-in-law's employment status and salary. The finding emphasises the relevance of the relative position in the income distribution rather than the absolute level of income.<sup>2</sup>

Why is an intra-household perspective in the context of this paper relevant? Research on household behaviour assumes households with more than one individual to act as one household. As argued in the theoretical and empirical analysis of Browning et al. (1994) and Browning and Chiappori (1998), individual household members have personal preferences, therefore distributional differences within households should be accounted for. The authors' findings suggest within household income differences to influence intra-household allocation, such as total expenditure.

Gender roles, expectations and identity add to divergence of personal preferences within households. D'Acunto et al. (2020) find different female and male environments to influence individual beliefs about key economic variables. For example, women perceive the household's financial situation as worse relative to men. The authors refer to those differences in belief as gender expectations gap. At the microlevel, gender expectations gaps can negatively impact gender wealth equality. Additional research shows, gender roles affect womens' preferences and outcomes in several domains, including choice of education (Moss-Racusin

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<sup>1</sup>The terms well-being, happiness and life satisfaction are used interchangeably.

<sup>2</sup>Additional papers on relative rather than absolute income as explanatory variable for happiness are Blanchflower and Oswald (2004); Van Praag and Frijters (1999); Clark et al. (1996); Easterlin (1995); McBride (2001) and Oswald (1997).

et al., 2012; Guiso et al., 2008; Dossi et al., 2019), occupation (Eagly and Steffen, 1984), career path (Adams and Kirchmaier, 2016; Goldin and Mitchell, 2017), and investment decisions (D’Acunto, 2019). In the area of household finance, Ke (2020) demonstrates stock market participation gaps between households with equally financially sophisticated wives and husbands. Ke (2020) argues those gaps are best explained by gender identity norms.

Bertrand et al. (2015) combine research on gender identity and intra-household labour income partition. By means of survey evidence, the authors show that the U.S. distribution of the wife’s income share exhibits a sharp drop at the point where the wife’s income exceeds her husband’s. According to Bertrand et al. (2015), the discontinuity is best explained by gender identity norms, which reduce the number of female primary breadwinner households. Bertrand et al. (2015) find identity norms to impact wife’s labor force participation, marital happiness, likelihood of divorce and the division of home production.

This paper combines the above strands of literature on happiness, intra-household and gender role research. The paper’s contribution is the extension of the current set of reference individuals as influence on subjective well-being. In particular, the effect of a female prime income contributor on happiness is analysed. Instead of non-household reference group individuals (Ferrer-i-Carbonell, 2005; Luttmer, 2005), this paper uses relative income within households as an explanatory factor for happiness. Various subsample estimates to disentangle our main effect and understand the presence of traditional gender role attitudes are estimated. In addition to Bertrand et al. (2015), who estimate cross-sectional U.S. marital happiness, we estimate German individual life-satisfaction with panel data. Thereby our research assures comparability to the happiness literature, builds on gender identity research on an intra-household level and adds to couple happiness mediation dynamics.

Our linear within couple and ordinal fixed-effects estimates suggest a female breadwinner to decreases spousal happiness by about 0.4 standard deviations. The economic significance of the estimate becomes evident when compared to external reference income. An increase in external reference income by approximately €70,000 (260%) corresponds to a similar decrease in individual well-being as having a or being the primary breadwinner wife. Our results are driven by younger birth year quartiles, lower education and total income households, East German couples and households with greater full-time employment share. The reasons being a reduced earnings gap among younger individuals, more frequent prime income contributor changes among lower education and total income households, greater relative labour market benefits among East German females and full-time employment driving income comparison. While the employment status results hint at the presence of gender roles, the subsample estimates on gender identity norms indicate the contrary. Thereby the paper extends the research on intra-household allocation, gender identity and within-household interdependence of subjective well-being, discussed amongst others in Bertrand et al. (2015) and Salland (2018).

The next section provides a literature overview. Section three describes our data and first descriptive evidence. Chapter four presents the paper’s estimation strategy. The results and corresponding subsample estimates to disentangle our main effect are discussed in chapter five. Chapter six concludes the paper.

## 2. Related Literature

The happiness literature identifies age (Clark et al., 1996), marital status (Clark and Oswald, 1994), employment status (Oswald, 1997), health and unobserved personality traits (Kahneman et al., 1999) as determinants of life-satisfaction. Variables such as gender, education or offspring show no clear impact on individual happiness.<sup>3</sup>

Empirical findings on the link between absolute income and happiness are mixed, while indicating significant relevance of relative income for individual happiness. Essentially, with respect to relative income, the happiness literature builds on personal income reference points (internal benchmarks) and income comparison to peers outside the household (external benchmarks). The choice of reference point varies from specific groups, for example colleagues (Rizzo and Zeckhauser, 2003; Clark et al., 2009b), friends (Senik, 2009), relatives (Senik, 2009) and neighbours (Clark et al., 2009a), to benchmarks such as predicted earnings (Clark and Oswald, 1996) or a representative individual (Easterlin, 2001). Therefore, subjective well-being depends on the divergence of one's current situation vis-à-vis the internal or external comparison benchmark(s).

As per research of Van Praag and Ferrer-i-Carbonell (2004), the internal benchmark is subject to an adaptation effect. An increase in satisfaction, for example due to rise in personal income, is (partly) diminished by an adjustment of aspirations. As for external benchmarks, evidence by Senik (2009) shows the greatest decline in well-being to stem from underperformance relative to former schoolmates or colleagues. The effect is referred to as envy or status effect. On the contrary, reference group performance may signal own future prospects. Hirschman and Rothschild (1973) coin this tunnel or signal effect. Empirical findings indicate status effects outweigh signal effects (Senik, 2009).<sup>4</sup>

Within the literature on relative income comparison and happiness, Ferrer-i-Carbonell (2005), who applies the German Socio-Economic Panel (GSOEP), documents income comparison asymmetries, i.e. richer individuals do not get happier from earning more than individuals with similar characteristics. As formulated by Duesenberry (1949), the opposite is true for poorer individuals. Moreover, Ferrer-i-Carbonell (2005) shows the relevance of personal and reference group income distance.<sup>5</sup>

Research on gender identity conducts its analysis on intra-household level. Akerlof and Kranton (2000) define two social categories 'man' and 'woman', which are connected with varying prescribed behaviours, i.e. identity. According to the authors' research, divergence from prescribed behaviours is costly and social norm dictates male primary breadwinner households. With reference to Akerlof and Kranton (2000), Bertrand et al. (2015) find gender identity prescriptions to influence social and economic outcomes. In the authors account, women reduce labor supply to avoid gender role reversal. Moreover, female primary

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<sup>3</sup>Selected publications which use subjective and individual well-being measures are Pradhan and Ravallion (2000), Van Praag and Ferrer-i-Carbonell (2004) and McBride (2001).

<sup>4</sup>The net effect becomes weaker if a comparison has higher informational value, i.e. a comparison to colleagues is more informative about the professional future than a comparison to family members.

<sup>5</sup>Clark and Senik (2010), by mean of the European Social Survey, affirm the comparison asymmetry and demonstrate that comparison intensity matters.

breadwinner households report reduced marital quality and an increase in the wife’s relative hours spent on home production, which suggests compensatory behaviour. According to Bertrand et al. (2015), standard marriage market models (Becker, 1973) can not explain the drop at 0.5 in the relative income distribution within U.S. households. Couples seem to avoid situations where female exceed male earnings. In terms of female labor market participation, the publication of Fernández et al. (2004) indicates higher labor force participation for wives of men brought up by a working mother.

The literature on intra-household allocation adds to varying and linked individual preferences per household, as made visible by research on gender identity. Based on individual preferences, Chiappori (1988) and Browning et al. (1994) develop a collective decision model for intra-household allocation. The authors argue the individual does not behave as a group. Further, publications in family economics indicate individual interactions are crucial to understand household behaviour (Becker, 1973; Lundberg and Pollak, 1994; and Duflo, 2003).

We contribute to these strands of literature by studying the impact of within household income comparison on individual happiness among German couples. Building on Salland (2018), our results show the influence of within partnership income comparison on individual happiness among unaltered, married couples, who report prime income contributor change. The paper’s findings hint at interdependence of couple happiness. When wives outearn their husbands, husband happiness reduces and female happiness seems to follow. Wives (barely) outearning their husbands could signal within household ‘competition’ and might foster envy.

### 3. Data & Descriptive Statistics

The empirical analysis applies the German Socio-Economic Panel (GSOEP)<sup>6</sup>. GSOEP is a nationally representative survey, conducted annually since 1984 in West Germany and 1990 in East Germany. Our estimation sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction<sup>7</sup>. We require couples to report positive labor income, prime income contributor change(s) and couple households to remain unchanged. Thereby we observe the same individuals over time and couple variation is not driven by partner changes.<sup>8</sup> Male or female heads can be flagged by means of gender and relationship to household head. Same-gender couples are not present in the data. Overall this leaves an estimation sample of 2,727 households with 33,554 observations (19,227 male and female observations). Households are on average observed in seven waves throughout the sample years 1984 until 2013.

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<sup>6</sup>The data set is version 30 of the GSOEP with DOI 10.5684/soep.v30.

<sup>7</sup>The survey question is: *‘And finally, we would like to ask you about your satisfaction with your life in general. Please answer by using the following scale, in which 0 means totally unhappy, and 10 means totally happy. How happy are you at present with your life as a whole?’*. Each individual’s answer can take discrete values from 0 to 10. The answer to the survey question is referred to as subjective well-being (SWB) and forms our dependant variable.

<sup>8</sup>Additional robustness checks are estimated in subsection 5.1.

The summary statistics of our benchmark estimation sample is depicted in Table 1 (column [1]). Additionally, to discuss female primary breadwinner sample differences, we split our sample into two subsamples. Column [2] pools male primary breadwinner and equal income share households<sup>9</sup>. Column [3] pools female primary income contributor households. Columns [4] and [5] illustrate mean difference and t-statistics of both subsamples.

Overall, mean life-satisfaction, measured on a scale from 0 to 10, is around 6.9 for husbands and 7 for wives.<sup>10</sup> The male partner is about 48 years of age, which is roughly three years older than his spouse. Approximately 42% of couples have cohabiting children. In about 75% of couple households the husband is the household head. Roughly 15% of wives and 9% of husbands have an educational level lower than high school. A degree above high school is attained by about 22%. The percentage of hospitalisation in the past 12 months for husband and wife is around 9 to 10%, mean annual labor income of husbands is €32,875 and €28,267 for their spouses and total household income is €66,778.<sup>11</sup> One potential source of a higher, average male labor income is the ratio of husband full-time employment. About 83% of husbands and 61% of wives work full-time.

Turning to columns two and three, differences in the characteristics of male and female primary breadwinners become apparent. As the paper’s analysis is based on households with prime income contributor changes, the sample’s female primary breadwinner ratio is close to parity (43%). Average individual happiness of husband and wife is about 0.1 to 0.2 points lower in the wife prime income contributor sample. A scatterplot by gender and wife’s income share (see Appendix - Figure A.2) illustrates both partner’s happiness declines as the wife’s income share increases. Moreover, the decline in subjective well-being is more pronounced for husbands. In his publication, Roth (2002) describes a fundamental law of marriage, namely: ‘you cannot be happier than your spouse’. The reduction of individual happiness in the female prime income contributor sample indicates the dependency described by Roth’s fundamental law of marriage. Thus, first descriptive evidence could indicate, the wife’s happiness reduces, due to her husband’s reduction in happiness because of a lower relative salary.<sup>12</sup>

In addition, female primary breadwinner households are older, less likely to be a household with cohabiting children, report higher female education as well as slightly lower male health and household income.<sup>13</sup> Within the female prime income contributor sample the

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<sup>9</sup>472 couple-year observations document equal income share.

<sup>10</sup>Figure A.1 depicts a histogram of the fraction of average husband and wife happiness. The distribution is fairly similar for both respondents.

<sup>11</sup>In our robustness section we check the explanatory power of an alternative health measure, namely self-reported health. About 13% of female and male partners are sick, i.e. report poor or bad health. Labor earnings are the sum of income from primary job, secondary job, self-employment, 13th month pay, 14th month pay, Christmas bonus pay, holiday bonus pay, miscellaneous bonus pay, and profit-sharing income (Grabka, 2013). Total household income is the aggregate of total family income from labor earnings, asset flows, private retirement income and private transfers (Grabka, 2013). All income related variables are reported in 2011 Euro values. For a detailed overview of our variable definitions see Table A.1.

<sup>12</sup>In subsection 5.2.1 we control for spousal satisfaction to better understand the effect.

<sup>13</sup>Differences in physical attributes, identified as matching criteria in marriage market models (Chiappori et al., 2012), were not found. Results are available upon request.



average wife and husband salary is €37,005 and €22,830, respectively. Naturally, in comparison to the male prime income contributor sample, male average labor income reduces and female average labor income increases. The underlying driver seems to be individual employment status, as husband full-time employment reduces by 19% and wife full-time employment increases by 28%. All sample differences are significant, except for the husband's percentage of lowest education level and female health variables.

In line with our research hypothesis, our key variable is the wife's relative income share, i.e. wife labor income divided by both partner's labor income. Analog to the argumentation by Bertrand et al. (2015), we want to understand the presence of distributional differences among male and female primary breadwinner households. Figure 1 A. depicts the distribution of couple relative income for our full sample, without the prime income contributor change condition, and under B. for our estimation sample (as depicted in Table 1 column [1]). The x-axis reports the income share earned by the wife and the y-axis represents the fraction of couples reporting the respective income share. Similar to the U.S. data of Bertrand et al. (2015), Figure 1 (A.) indicates a distributional drop for female primary breadwinner households. The application of the McCrary (2008) test for discontinuity of the distribution function estimates a 21.6% drop (t-ratio 6.2) in the distribution when the wife's income exceeds her husbands. According to Bertrand et al. (2015), greater distributional discontinuity hints at aversion to higher female salary within households. The distribution of couple relative income for our estimation sample - part (B.) of Figure 1 - captures a bell-shaped distribution, i.e. male and female primary breadwinner households are split more evenly. An underlying factor for the equal split is the prime income contributor change condition. Potentially more income changes are observed, due to higher female full-time employment and therefore labor income.

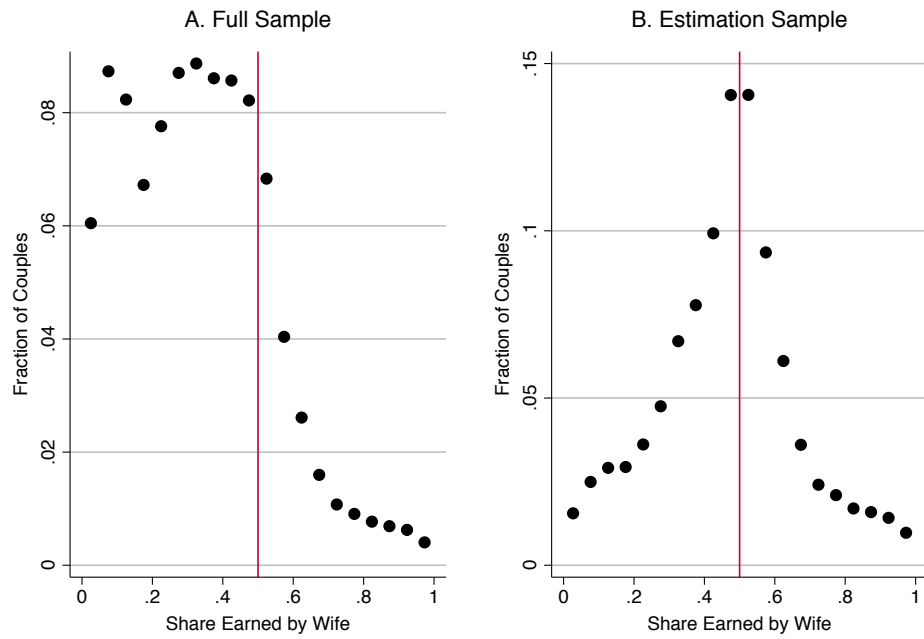
Thus, based on sample differences in socio-economic determinants and a first descriptive analysis, we cannot per se attribute SWB differences to marital income divergence. Our results might be driven by confounding factors. To understand the role of a female prime income contributor in the context of couple happiness, we apply the estimation strategy illustrated in the next section.

Table 1: Summary Statistics

	[1] Estimation Sample Mean	[2] Income Share Wife $\leq 0.5$ Mean	[3] Income Share Wife $> 0.5$ Mean	[4] Mean Difference (2)-(3)	[5] T-Statistics
Life-satisfaction Wife	7.015	7.050	6.969	0.082***	4.711
Life-satisfaction Husband	6.897	6.990	6.774	0.217***	12.275
Age Wife (in years)	45.370	44.798	46.119	-1.320***	-15.348
Age Husband (in years)	48.093	47.630	48.700	-1.070***	-11.845
Children in Household (in %)	0.416	0.454	0.366	0.089***	17.558
Husband Household Head (in %)	0.746	0.786	0.695	0.090***	20.291
Education Wife (in %):					
Less than High School	0.149	0.162	0.132	0.030***	8.322
High School	0.631	0.647	0.609	0.039***	7.791
More than High School	0.220	0.190	0.259	-0.069***	-16.265
Education Husband (in %):					
Less than High School	0.091	0.093	0.088	0.004	1.433
High School	0.690	0.684	0.697	-0.013**	-2.832
More than High School	0.219	0.223	0.214	0.009*	2.170
(Self-reported) Health (in %):					
Wife Sick	0.126	0.126	0.126	-0.001	-0.142
Husband Sick	0.132	0.126	0.139	-0.012***	-3.373
Wife Hospitalised (in t-1)	0.100	0.102	0.096	0.006	1.889
Husband Hospitalised (in t-1)	0.090	0.087	0.094	-0.007*	-2.533
Employment Status Wife (in %):					
Working Full-Time	0.609	0.491	0.765	-0.275***	-57.001
Working Part-Time	0.285	0.369	0.174	0.195***	43.062
Employment Status Husband (in %):					
Working Full-Time	0.831	0.911	0.726	0.185***	49.601
Working Part-Time	0.034	0.018	0.055	-0.037***	-19.897
Income (in €):					
Labor Income Wife	28,267	21,589	37,005	-15,416***	-72.613
Labor Income Husband	32,875	40,552	22,830	17,722***	74.493
Other Household Income	9,303	8,872	9,867	-995***	-6.957
Total Household Income	66,778	67,903	65,306	2,597***	6.336
Observations	38,554	21,854	16,700		

**N O T E:** Significance: \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged. Life-satisfaction is measured on a scale from 0 (minimum) to 10 (maximum). Income variables are reported in 2011 euro values.

Figure 1: Distribution of Relative Household Income - Full & Estimation Sample



**N O T E:** Sample: (G)SOEP 1984 - 2013. The estimation sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged. The main difference between full (A.) and estimation (B.) sample is, the full sample captures households with and without prime income contributor changes. Each dot represents a fraction of couples grouped into 20 relative income bins. The vertical line at 0.5 indicates equal couple income distribution.

#### 4. Estimation Strategy

Happiness survey questions rank well-being on a 0 (minimum) to 10 (maximum) Likert scale. The answer range is 'not satisfied' to 'completely satisfied'. A happiness increase from 3 to 5 does not necessarily imply an identical increase in satisfaction compared to an increase from 6 to 8, since well-being is an ordinal rather than a cardinal measure. Contrary to the classical ordinal estimation approach, Ferrer-i-Carbonell and Frijters (2004) find the assumption of ordinality to hardly affect happiness estimates. Other publications which apply linear happiness estimations are Stutzer and Frey (2008), Clark and Senik (2010) and Di Tella et al. (2010). Our estimation strategy adheres to Ferrer-i-Carbonell and Frijters (2004) and estimates OLS models.<sup>14</sup> Thereby we can relate changes in happiness to changes in the observables.

As stressed in Argyle (1999) and Diener and Lucas (1999), fixed personality traits are influential predictors of satisfaction. Random effects estimates do not account for the relation of personal traits with observable individual characteristics. Fixed-effects models allow to address partial omitted variables bias by controlling for constant confounding unobservables. This is affirmed by Ferrer-i-Carbonell and Frijters (2004), who find individual fixed-effects to change well-being results substantially. In a fixed-effects setting, the statistical relationship between marital breadwinners and subjective well-being is captured by variation in relative income within couples across time. Therefore, we estimate OLS regressions with individual and couple fixed-effects. Our settings address unobserved time-constant heterogeneity on the individual or couple level. Following Bertrand et al. (2015), we base our interpretation of relative couple earnings on a flag for primary breadwinner wives.

Equations (1) and (2) state our fixed-effects specification for subjective well-being ( $SWB_{it}$ ), our variable of interest ( $X_{it}^{IncomeShareWife>0.5}$ ) and the related elasticity  $\beta_1$ . The control vector is denoted  $X_{it}^{Controls}$  and the constant is composed of  $\beta_0$  and a time-invariant individual or household fixed-effect  $U_i\gamma$  (depending on whether couple or individual baseline estimates are evaluated).  $U_i$  is a vector of unobservable confounding factors. Additionally, region and year-fixed effects ( $R_r$  and  $Y_t$ ) are included in our specifications. Initially, SWB is estimated per partner. To tackle unobserved heterogeneity at the couple level, we combine the male and female subsample and estimate individual happiness with couple fixed-effects. A negative (positive)  $\beta_1$  coefficient would suggest a decrease (increase) in well-being, while an estimate close to zero implies no effect. Given the findings on reduced marital quality and compensatory behaviour among female primary breadwinner households (Bertrand et al., 2015), we expect female breadwinners to reduce individual SWB per household.

$$SWB_{it} = \beta_{0,i} + \beta_1 X_{it}^{IncomeShareWife>0.5} + \beta_2 X_{it}^{Controls} + Y_t + R_r + \epsilon_{it} \quad (1)$$

$$\beta_{0,i} = \beta_0 + \gamma U_i \quad (2)$$

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<sup>14</sup>The sensitivity of our estimates to the cardinality assumption is verified in our robustness estimations.

Overall we estimate three baseline configurations. Configurations one and two are individual wife and husband fixed-effects and configuration three is a couple fixed-effects estimation. Our benchmark configurations include individual and partner demographic controls, a flag for the household head, log other household and individual as well as spousal labor income. Other control variables are absolute income rank difference, a flag for households with cohabiting children, health controls and job industry controls for both partners.<sup>15</sup> Moreover, we add a control variable for individual reference income<sup>16</sup>. Empirical findings suggest a negative coefficient for this variable. All control variables are motivated by our female primary breadwinner sample differences, the empirical literature on happiness and research on gender identity.

## 5. Results

This section discusses the results of our fixed-effects specifications, as presented in the estimation strategy. Subsection 5.1 shows the benchmark wife and husband individual as well as couple fixed-effects configurations. Moreover, benchmark robustness specifications are estimated. Subsection 5.2 presents socio-economic and gender role subsample estimates to disentangle our main effect.

### 5.1. Benchmark Results: Couple Income Comparison and Happiness

In line with our research hypothesis and the presented estimation strategy, we present our individual and couple fixed-effects benchmark estimates in Table 2. Configuration (1) presents husband, configuration (2) wife and configuration (3) couple fixed-effects. Turning to configuration (1), our main variable of interest ( $\text{Income Share Wife} > 0.5$ ) has a negative coefficient and is significantly different from zero at the one percent level. The magnitude of the variable translates to an almost 11% decrease in husband subjective well-being if his wife reports higher relative labor income. This is a decrease in SWB of roughly 0.45 standard deviations. As for the control variables, personal log labor income shows a positive and insignificant coefficient. The partner's log transformed labor income renders a positive and significant coefficient. A log point increase in the partner's income (roughly €37,000) translates into a 12% increase in subjective well-being. Log total other household income has a small, insignificant and positive coefficient.

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<sup>15</sup>The absolute male and female income rank difference is estimated within the gender-specific income distribution. As per standard assortative matching models (Weiss, 1997), the variable tests whether the relative individual income percentile matters, rather than greater absolute income. The health control variables capture partner or personal hospitalisation in previous twelve months (Di Tella et al., 2010). Other household income is equal to total post government household income plus taxes minus individual respondent and spouse labor income.

<sup>16</sup>In line with Ferrer-i-Carbonell (2005) and McBride (2001), annual reference income is defined as the income average of similar education, gender, age and regional cells. We calculate reference income prior to the application of our sample filters. Accordingly, more information is captured by the reference income variable.

To account for reference group income comparison, configuration (1) additionally includes the husband’s log reference income. As suggested in previous empirical findings (Senik, 2009), the variable has a negative and significant effect on SWB. A log point increase in reference income (roughly €56,000) indicates a 13% decrease in SWB. Put differently, an increase in the husband’s reference income by 230% (€83,000) corresponds to a similar decrease in SWB as having a primary breadwinner wife.

The included control variables on socio-demographics, absolute income rank difference of husband and wife, individual health, presence of children in the household as well as for job industry and nationality are in line with previous empirical findings. None of the control variables revert the main finding, i.e. husband SWB decreases significantly if his wife earns a relatively higher labor income.

We now turn to configuration (2). Configuration (2) estimates wife fixed-effects. The negative sign of our main explanatory variable indicates reduced happiness as the wife turns the household’s primary breadwinner. The magnitude of this reduction is roughly 7% on the subjective well-being scale in comparison to couples with equal labor income or a male primary breadwinner. This is a decrease in SWB of roughly 0.3 standard deviations. Personal and partner log income have a positive and significant effect on SWB. Other household and reference income have a small, negative and insignificant effect on individual happiness. All control variables are in line with the previous empirical findings. Configuration (2) estimates indicate, a primary breadwinner wife reports lower SWB.

Our third baseline estimation combines the configuration (1) and (2) samples and estimates individual happiness with couple fixed-effects. Configuration (3) thereby accounts for unobserved heterogeneity at the couple level. The estimation results of configuration (3) confirm previous baseline husband and wife estimates. A primary breadwinner wife decreases average spousal happiness through a reduction of individual happiness levels. The magnitude of our variable of interest suggests a 9% decrease in both partner’s subjective well-being. This is a decrease in SWB of roughly one third of a standard deviation. To illustrate the magnitude of the effect, an increase in personal reference income by factor 3.6 corresponds to a similar reduction in individual happiness as having or being a primary breadwinner wife.

As far as the other control variables are concerned, personal labor income (of both partners) shows a positive and significant coefficient. Log total other household income has a small, positive but insignificant coefficient. Personal log reference income has a negative and significant effect on SWB. The other control variables are in line with previous empirical findings.

Overall, the baseline estimations indicate the importance of personal reference income and primary breadwinner status. Income comparison seems to be present relative to external reference groups, but also on a within household level. On either level a significant coefficient is visible. The finding is in line with the happiness literature and could affirm female primary breadwinner aversion (Bertrand et al., 2015), but certainly an extension of the current set of reference individuals (previously found outside the household). The magnitude of the breadwinner effect and its economic significance in relation to other papers’ findings on external reference income is considerable. Vendrik and Woltjer (2007), who analog to our

paper estimate GSOEP fixed-effects least-squares regressions, find a negative and significant coefficient for logarithmic family reference income of about -0.31. In comparison, our baseline logarithmic individual reference income coefficient is -0.1. This implies one-third of the magnitude of Vendrik and Woltjer (2007) and about a third of the estimated magnitude of individual happiness reduction, due to a primary breadwinner wife.

Table 2: Fixed-Effects Results - Relative Income & Life-Satisfaction

	(1) Husband FE Coef./ (SE)	(2) Wife FE Coef./ (SE)	(3) Couple FE Coef./ (SE)
Income Share Wife > 0.5	-0.108*** (0.036)	-0.069** (0.035)	-0.089*** (0.030)
Ln Wife Labor Income	0.122*** (0.024)	0.138*** (0.025)	0.132*** (0.021)
Ln Husband Labor Income	0.041 (0.027)	0.041* (0.024)	0.041* (0.022)
Ln Other Household Income	0.005 (0.008)	-0.002 (0.007)	0.001 (0.006)
Ln Reference Income	-0.132** (0.064)	-0.014 (0.067)	-0.101*** (0.026)
Absolute Income Rank Difference	Yes	Yes	Yes
Wife and/or Husband Hospitalized (in t-1)	Yes	Yes	Yes
Nationality Husband and Wife	Yes	Yes	Yes
Job Industry Code Husband and Wife	Yes	Yes	Yes
R-squared	0.063	0.042	0.039
Cluster	2727	2727	2727
Observations	19277	19277	38554

**N O T E:** Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged. Life-satisfaction is measured on a scale from 0 (minimum) to 10 (maximum). *Income Share Wife > 0.5* is a dummy which flags primary breadwinner wives. All regressions include age, age-squared and education level (3 categories) of wife and husband. A household head indicator, a flag for households with cohabiting children and region as well as time fixed-effects are included in all estimation. Standard errors are clustered at the individual or couple level and reported in parenthesis.

Next, we investigate the robustness of our benchmark fixed-effects estimates. First, we perform effect-related robustness checks by altering the set of control variables. Second, to understand if survey design impacts our results, we estimate sample robustness checks. Third, we check whether technical aspects such as choice of estimator affect our results.

Our robustness estimations are depicted in Table A.2 (Appendix). Estimation configurations [1] until [3] include self-reported health instead of hospitalisation, preference shifters such as recent birth of child and occupational prestige<sup>17</sup>. Configurations [4] (weighted estimation), [5] (at least one household member instead of both reports positive labor income) and [6] (couples are married or cohabiting) are technical and sample robustness checks. Estimation models [7] until [9] present random- and correlated random-effects<sup>18</sup> ordered logit configurations as well as delta couple estimates. The delta regression estimates individual happiness as function of changes in primary breadwinner status. Similar to Brunnermeier and Nagel (2008), our delta estimates include lifecycle, preference shifter and lagged income control variables. The robustness estimations are in line with our main findings and indicate robustness. A primary breadwinner wife decreases couple individual happiness.

## 5.2. Understanding the Breadwinner Effect

This subsection presents additional results to better understand the breadwinner effect. The drivers of our main results are disentangled by means of subsample estimations. Precisely, the baseline fixed-effects are estimated for different socio-economic groups such as birth year cohort, income, labour market, education and institutional subsamples. Additionally, we shed light on gender roles, the dependency of individual and partner happiness as well as relative couple income groups, which could drive our main results.

### 5.2.1. Can you be happier than your spouse?

In his publication, Roth (2002) describes a fundamental law of marriage, namely: 'you cannot be happier than your spouse'. The author's example applies to the context of market design and job search among college graduate couples. Per the argument of Roth, a couple landing one 'good' and one 'mediocre' job has the incentive to continue the search and land a second 'good' job. What Roth indicates is preferences are interdependent.

When transferred to our setting, a reduction of individual happiness in the female prime income contributor sample hints at happiness dependency on within couple level. The presented descriptive evidence could indicate, the wife's happiness reduces, due to her husband's reduction in happiness because of a lower relative salary. In order to understand the potential interdependency, we re-estimate husband and wife benchmark estimates with partner happiness controls.

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<sup>17</sup>The Treiman Occupation Prestige Score is our measure of occupational prestige (Ganzeboom and Treiman, 1996). The control variable is based on Di Tella et al. (2010). Di Tella et al. (2010) find happiness adaptation effects related to job prestige.

<sup>18</sup>Correlated random-effects (CRE) estimations allow for correlation between the couple random-effect and the covariates (Mundlak, 1978). In practice, correlated random-effects regressions extend random-effects estimations with the averages of all time-varying regressors. CRE estimations can be regarded a mix of fixed and random-effects.



Table 3 presents the extended individual benchmark configurations. Column (1) depicts husband and column (2) wife fixed-effects estimates. Both configurations present a positive and significant coefficient for spousal satisfaction, i.e. a happy partner increases personal happiness. To name the magnitude, a one point increase in partner happiness translates into a 33 to 34% increase in personal happiness. This implies, a partner happiness increase by 0.6 standard deviations results in personal happiness increase of 1.4 standard deviations. Our main variable of interest, the female primary breadwinner flag reacts differently to the inclusion of partner happiness in the respective spousal estimation. The husband sample continues to exhibit a negative and significant effect of a primary breadwinner wife on husband individual happiness. In comparison to our benchmark results (Table 2), the effect is slightly reduced by about 2.3 percentage points. This implies, husband subjective well-being decreases by 8.5% if his wife reports higher relative labor income. Turning to configuration (2), the magnitude of our main variable of interest reduces to a 3.4% decrease in female happiness, once turning the prime income contributor. Other than in the benchmark configuration, the coefficient is not statistically significant.

The presented results for individual male and female subsamples reflect the explanatory relevance of partner happiness, but also hint at the wife’s happiness decrease to follow male happiness reduction. It is the husband’s dissatisfaction with higher relative female earnings and consequential reduced happiness that could cause female happiness to reduce in a female primary breadwinner sample.

This finding is in line with research on happiness interdependence on household level. The publications of Diener (2009) and Sandvik et al. (2009) show spouses are generally able to predict partner happiness levels. Empirical evidence for positive correlation among spousal happiness is found in Schimmack and Lucas (2006). Moreover, Weiss and Willis (1997) find an unexpected increase in the wife’s income to raise the probability of divorce. Guven et al. (2012) add to the finding and find an increased couple happiness gap to increase the likelihood of separation. In the context of our work, where we observe happiness reduction as well as an increased happiness gap among female primary breadwinner households, we assume reduced happiness to precede divorce and limit our analysis to constant couple households, irrespective of a potential divorce.<sup>19</sup>

### 5.2.2. *Are specific couple income differences a driver of our result?*

Happiness research discusses multiple layers of income comparison. As detailed in the literature review, the income reference point for comparison of personal to reference income may vary from specific groups, such as colleagues, friends, relatives and neighbours to benchmarks such as predicted earnings. In terms of comparison differences among groups, previous empirical research by Clark and Senik (2010) finds married individuals to compare more to family members.

Based on our key explanatory variable, we are able to show the importance of income comparison on family level. Other than previous publications, the comparison group in our publication lies within the individual’s household. In order to get an understanding of

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<sup>19</sup>Our robustness checks in subsection 5.1 address any survival bias related to the sample filters applied.

the intra-partner comparison 'intensity', we split our main explanatory variable into various income ratio categories. Thereby we are able to disentangle which category drives our results. The subgroups are: female relative income share equal to 0-25%, 26-49%, 50%, 51-74% and 75-100%.<sup>20</sup>

Table 4 presents the estimation coefficients of our baseline couple fixed-effects estimation, including a categorical variable for the income ratio groups. As per the estimates, our results are driven by the income ratio group of female earnings equal or bigger 51 and smaller 75%. In comparison to the configuration's reference group income ratio of female labour income bigger or equal to 26 and smaller 50%<sup>21</sup>, a female breadwinner with an income share of up to 74% reduces couple individual happiness by roughly 8%. In light of the happiness literature on comparison intensity, our findings could indicate wives barely outearning their husbands signal competition (within 'reach') on household level. The finding potentially adds a new within couple dimension of the envy effect previously studied among comparison groups outside the household (Senik, 2009).

### 5.2.3. Do socio-economic differences play a role?

To unwind potential socio-economic differences in our main findings, we re-estimate our benchmark configurations for different birth year cohorts, household income and education levels, couples living in West and East Germany prior the German reunification and couples with different full- and part-time employment status combinations.

Configurations (1) - (4) in Table 5 present birth year quartile estimation results of our baseline couple fixed-effects. Configurations (3) and (4) indicate the presence of birth year cohort effects in our estimation sample, i.e. younger individuals drive the baseline estimation results. Both estimations show significant individual happiness reduction of about 13 to 16% for female primary breadwinner households. A negative but insignificant effect is visible for the first and second birth year quartiles<sup>22</sup>. The estimates seem related to average couple birth year quartile income differences, since on average more wives outearn their husband in younger birth cohorts<sup>23</sup>. Our finding could be linked to different absolute and relative income levels among younger birth cohorts and across gender. The model of household specialisation and division of labor (Becker, 1981) predicts specialisation by gender at a reduced marriage earnings gap across time. Juhn and McCue (2017) confirm a reduced earnings gap across time. A reduced earnings gap among younger individuals could therefore increase the probability of female primary breadwinners and envy effects.

Additionally, Table 5 presents income and institutional subsample estimates. Configurations (5) and (7) indicate our couple baseline estimates are driven by lower income and

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<sup>20</sup>The sample split per subgroup is: 13.36%, 42.10%, 1.22%, 35.30% and 8.12% of observations, respectively. All ratios apply to our estimation sample.

<sup>21</sup>The estimation reference group is based on the group with the highest number of observations.

<sup>22</sup>Figure A.3 (Appendix) adds to the quartile subsample estimation and depicts estimation coefficients and corresponding confidence intervals for baseline couple fixed-effects birth year decile subsamples. A significant individual happiness reduction is depicted for younger birth year deciles.

<sup>23</sup>Figure A.4 (Appendix) present the average husband and wife income difference per birth year quartile. On average individuals are 39, 44, 49 and 54 years of age in the respective birth year quartile.

former Eastern German households<sup>24</sup>. Lower income households are quartile one and two total household income couples, i.e. below median observations. The mean total household income for the low and high household income subsamples is about €41,000 and €92,000.

A possible explanation for the difference across household income subsamples is the greater level of 'competition' among lower income households. Frequent within household primary breadwinner changes, as visible among lower income households, lead to continuous role adaptation and intra-household income comparison, due to greater income similarity<sup>25</sup>.

Turning to configuration (7), Frijters et al. (2004) show East Germans experience a continued improvement in life-satisfaction to which increased household income contributes largely. Additionally, Jurajda (2005) finds an extremely low overall East German wage gap and argues productivity characteristics of East German female full-time employees are substantially higher in comparison to their male counterparts. This leads to a positive female wage 'penalty'. As the pre-reunification Eastern German income distribution was rather egalitarian (Cornelsen and Pohl, 1979; Fuchs-Schündeln, 2009) and female employees benefit more from reunification (Jurajda, 2005), husbands seem to drive the significant 8% reduction in individual life-satisfaction for female primary breadwinner households among GDR couples.<sup>26</sup>

We now turn to our employment status subsample estimations. As per the empirical literature, Clark and Senik (2010) see a rise in income comparison intensity with the number of working hours. Moreover, previously shown birth year quartile and household income level estimations hint at potential labour market effects. To add to our understanding of the breadwinner effect, we estimate four employment status subsamples, namely both partners working full-time, both working part-time, husband working full-time and wife working full-time. The estimation coefficients (Table 6) support previously discussed envy effects and increased comparison intensity with the number of working hours. Both partners working full-time or minimum the wife working full-time are the main contributors to our finding. The magnitude of our main effect is greatly increased in configuration (3). When minimum the wife works full-time and outearns her husband, subjective individual happiness is reduced by about 44%. This implies a magnitude of approximately five times the magnitude of our baseline couple fixed-effects configuration. At mean couple happiness of 6.96 this implies a reduction of about 3.1 happiness points or 1.8 standard deviations. Additionally, since female full-time employment is not per se in alignment with traditional gender roles, the coefficient could indicate the presence of a gender role mindset, which is analysed in subsection 5.2.4.

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<sup>24</sup>The GDR variable is based on the question where an individual lived prior German reunification. Amongst others, the publication by Alesina and Fuchs-Schündeln (2007) applies a similar identification of individuals exposed to 'socialist' institutions.

<sup>25</sup>Figure A.5 (Appendix) depicts more frequent average primary breadwinner changes among quartile one and two total income households.

<sup>26</sup>Figure A.6 (Appendix) supports the argument and depicts higher average happiness for GDR individuals if labor income is distributed more egalitarian among couples, i.e. closer to a 50% share. Assimilation effects for mixed East and West German couples cannot be estimated, due to few observations in our estimation sample.

Our descriptive analysis indicates female and male primary breadwinner education sample differences. In their publication, Bertrand et al. (2015) describe distributional discontinuity of the wife’s income share, when she becomes the primary breadwinner. The authors argue, the distributional drop is more pronounced among couples, who report a high school degree or less, compared to households with more than high school education.

Table 7 presents various education subsample estimations for our benchmark couple fixed-effects configuration. The subsamples with higher education levels - configuration (1) until (3) - depict a negative but insignificant effect of our main explanatory variable on couple individual happiness. Configuration (4) and the subsequent configurations (5) until (8), with lower husband and wife education level combinations, show negative and significant coefficients for a female primary breadwinner. As per configuration (6), the greatest decline of about 27% in individual well-being is visible for a wife with a lower relative education level outearning her husband.

Generally, our finding is consistent with the subsample findings for lower income groups, assuming positive correlation between education and income. Moreover, our finding could be linked to Bertrand et al. (2015). The authors find more less educated U.S. World Value Survey (WVS) respondents to agree with the statement: *‘if a woman earns more money than her husband, it’s almost certain to cause problems’*.<sup>27</sup>

#### 5.2.4. What about gender roles?

Following the publications presented in our literature review, gender roles can impact personal preferences and intra-household dimensions, such as marital happiness, likelihood of divorce, division of home production (Bertrand et al., 2015) and occupation (Eagly and Steffen, 1984). Additionally, Ke (2020) demonstrates stock market participation gaps between households with equally financially sophisticated wives and husbands.

To understand gender roles in the context of our setting, our subsample estimation approach follows Ke (2020). The subsamples for which we reestimate our baseline couple fixed-effects are husbands brought up by working mothers, religious individuals and partnerships with an unequal ‘say’ in the context of major household decisions. The rationale for the subsamples are the empirical findings on higher labor force participation for wives of men brought up by a working mother (Fernández et al., 2004), a more conservative, potentially gender role supportive attitude among religious individuals (Guiso et al., 2003) and a more gender role adherent household with a male main decision maker (Ke, 2020).

Our coefficients for the estimated gender role subsamples indicate no presence of gender role effects.<sup>28</sup> The reason could be rooted in the fact that all subsample exercises reduce the number of observations greatly. Given the gender role subsample estimations, as performed in the literature, we do not find any impact of gender roles in our setting. Nevertheless, our subsection 5.2.3 results, indicating female full-time employment status effects, could hint at the presence of gender roles.

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<sup>27</sup>We observe a similar pattern for German WVS respondents. About 24% of respondents with a high school degree or less, opposed to approximately 8% with at least a college degree, agree with the statement. The analysis applies WVS wave 6 (2010-2014) and captures 1,996 responses with education information.

<sup>28</sup>Results available upon request.

Table 3: Fixed-Effects Results - Relative Income &amp; Life-Satisfaction - Partner Happiness

	(1) Husband FE Coef./(SE)	(2) Wife FE Coef./(SE)
Income Share Wife > 0.5	-0.085** (0.033)	-0.034 (0.032)
Ln Wife Labor Income	0.075*** (0.022)	0.098*** (0.023)
Ln Husband Labor Income	0.027 (0.024)	0.029 (0.022)
Ln Other Household Income	0.006 (0.007)	-0.004 (0.006)
Ln Reference Income	-0.118** (0.059)	0.002 (0.061)
Life-satisfaction Wife	0.337*** (0.012)	
Life-satisfaction Husband		0.325*** (0.012)
Absolute Income Rank Difference	Yes	Yes
Wife and/or Husband Hospitalized (in t-1)	Yes	Yes
Nationality Husband and Wife	Yes	Yes
Job Industry Code Husband and Wife	Yes	Yes
R-squared	0.166	0.147
Cluster	2727	2727
Observations	19277	19277

**N O T E:** Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged. Life-satisfaction is measured on a scale from 0 (minimum) to 10 (maximum). *Income Share Wife > 0.5* is a dummy which flags primary breadwinner wives. All regressions include age, age-squared and education level (3 categories) of wife and husband. A household head indicator, a flag for households with cohabiting children and region as well as time fixed-effects are included in all estimation. Standard errors are clustered at the individual or couple level and reported in parenthesis.

Table 4: Fixed-Effects Results - Relative Income &amp; Life-Satisfaction - Income Ratio Groups

	(1) Income Ratio Group FE-Estimation Coef./ (SE)
0-25%	0.024 (0.048)
26-49%	<i>Reference Group</i>
50%	0.035 (0.083)
51-74%	-0.084*** (0.031)
75-100%	-0.061 (0.069)
Ln Wife Labor Income	0.138*** (0.027)
Ln Husband Labor Income	0.043 (0.028)
Ln Other Household Income	0.001 (0.006)
Ln Reference Income	-0.101*** (0.026)
Absolute Income Rank Difference	Yes
Wife and/or Husband Hospitalized (in t-1)	Yes
Nationality Husband and Wife	Yes
Job Industry Code Husband and Wife	Yes
R-squared	0.039
Cluster	2727
Observations	38554

**N O T E:** Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged. Life-satisfaction is measured on a scale from 0 (minimum) to 10 (maximum). *Income Share Wife > 0.5* is a dummy which flags primary breadwinner wives. All regressions include age, age-squared and education level (3 categories) of wife and husband. A household head indicator, a flag for households with cohabiting children and region as well as time fixed-effects are included in all estimation. Standard errors are clustered at the individual or couple level and reported in parenthesis.

Table 5: Fixed-Effects Results - Relative Income &amp; Life-Satisfaction - Socio-Economic Subsamples

	(1) Q1: $\geq 1920 - 1948$ Coef./ (SE)	(2) Q2: $> 1948 - 1955$ Coef./ (SE)	(3) Q3: $> 1955 - 1960$ Coef./ (SE)	(4) Q4: $> 1960 - 1991$ Coef./ (SE)
Income Share Wife $> 0.5$	-0.069 (0.061)	-0.028 (0.052)	-0.165*** (0.054)	-0.132** (0.055)
Ln Wife Labor Income	0.112*** (0.035)	0.127*** (0.040)	0.205*** (0.049)	0.084** (0.033)
Ln Husband Labor Income	0.052 (0.036)	0.033 (0.041)	0.029 (0.044)	0.025 (0.046)
Ln Other Household Income	-0.002 (0.010)	-0.001 (0.011)	0.014 (0.011)	-0.001 (0.015)
Ln Reference Income	-0.079** (0.040)	-0.003 (0.097)	-0.103 (0.075)	-0.093* (0.051)
Absolute Income Rank Difference	Yes	Yes	Yes	Yes
Wife and/or Husband Hospitalized (in t-1)	Yes	Yes	Yes	Yes
Nationality Husband and Wife	Yes	Yes	Yes	Yes
Job Industry Code Husband and Wife	Yes	Yes	Yes	Yes
R-squared	0.050	0.051	0.060	0.055
Cluster	1045	938	759	856
Observations	10401	10340	8430	9383
	(5) Low HH Inc. Coef./ (SE)	(6) High HH Inc. Coef./ (SE)	(7) East Couple Coef./ (SE)	(8) West Couple Coef./ (SE)
Income Share Wife $> 0.5$	-0.112** (0.049)	-0.053 (0.038)	-0.081* (0.048)	-0.041 (0.051)
Ln Wife Labor Income	0.112*** (0.028)	0.092** (0.040)	0.188*** (0.040)	0.155*** (0.033)
Ln Husband Labor Income	0.024 (0.029)	0.050 (0.045)	0.074 (0.052)	0.041 (0.031)
Ln Other Household Income	0.008 (0.009)	-0.011 (0.009)	0.004 (0.013)	-0.003 (0.009)
Ln Reference Income	-0.117*** (0.032)	-0.084** (0.036)	-0.060 (0.068)	-0.063 (0.046)
Absolute Income Rank Difference	Yes	Yes	Yes	Yes
Wife and/or Husband Hospitalized (in t-1)	Yes	Yes	Yes	Yes
Nationality Husband and Wife	Yes	Yes	Yes	Yes
Job Industry Code Husband and Wife	Yes	Yes	Yes	Yes
R-squared	0.049	0.029	0.040	0.059
Cluster	2107	1743	458	579
Observations	19278	19276	11380	12308

**N O T E:** Significance: \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged. Life-satisfaction is measured on a scale from 0 (minimum) to 10 (maximum). *Income Share Wife  $> 0.5$*  is a dummy which flags primary breadwinner wives. All regressions include age, age-squared and education level (3 categories) of wife and husband. A household head indicator, a flag for households with cohabiting children and region as well as time fixed-effects are included in all estimation. Standard errors are clustered at the individual or couple level and reported in parenthesis. Configurations (1) - (4) present birth year quartile subsample estimations, configurations (5) and (6) are estimated for below and above median household income and configurations (7) and (8) are East and West German couple household estimations.

Table 6: Fixed-Effects Results - Relative Income &amp; Life-Satisfaction - Full-Time vs. Part-Time Employment

	(1) Both FT Coef./(SE)	(2) Husb. FT Coef./(SE)	(3) Wife FT Coef./(SE)	(4) Both PT Coef./(SE)
Income Share Wife > 0.5	-0.085** (0.038)	-0.084 (0.077)	-0.442* (0.234)	0.194 (0.328)
Ln Wife Labor Income	0.243*** (0.044)	0.108** (0.050)	-0.125 (0.267)	0.066 (0.445)
Ln Husband Labor Income	0.050 (0.045)	0.087 (0.064)	-0.030 (0.176)	-0.118 (0.172)
Ln Other Household Income	-0.010 (0.008)	0.008 (0.014)	0.005 (0.031)	-0.164 (0.102)
Ln Reference Income	-0.058* (0.035)	-0.168*** (0.047)	0.105 (0.126)	-0.006 (0.161)
Absolute Income Rank Difference	Yes	Yes	Yes	Yes
Wife and/or Husband Hospitalized (in t-1)	Yes	Yes	Yes	Yes
Nationality Husband and Wife	Yes	Yes	Yes	Yes
Job Industry Code Husband and Wife	Yes	Yes	Yes	Yes
R-squared	0.033	0.040	0.120	0.190
Cluster	1879	950	161	127
Observations	20144	8968	684	538

**N O T E:** Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged. Life-satisfaction is measured on a scale from 0 (minimum) to 10 (maximum). *Income Share Wife > 0.5* is a dummy which flags primary breadwinner wives. All regressions include age, age-squared and education level (3 categories) of wife and husband. A household head indicator, a flag for households with cohabiting children and region as well as time fixed-effects are included in all estimation. Standard errors are clustered at the individual or couple level and reported in parenthesis.



Table 7: Fixed-Effects Results - Relative Income &amp; Life-Satisfaction - Education Subsamples

	(1) Both more than HS Coef./(SE)	(2) Husb. more than HS Coef./(SE)	(3) Wife more than HS Coef./(SE)	(4) Both HS or less Coef./(SE)	(5) Husb. HS Wife HS Coef./(SE)	(6) Husb. HS Wife less Coef./(SE)	(7) Wife HS Husb. less Coef./(SE)	(8) Wife less Husb. less Coef./(SE)
Income Share Wife > 0.5	-0.164 (0.155)	-0.008 (0.159)	-0.020 (0.099)	-0.088*** (0.032)	-0.079* (0.041)	-0.266*** (0.093)	-0.011 (0.083)	-0.092 (0.081)
Ln Wife Labor Income	0.232*** (0.078)	-0.072 (0.091)	0.045 (0.062)	0.127*** (0.023)	0.117*** (0.030)	0.097 (0.089)	0.094 (0.059)	0.158*** (0.054)
Ln Husband Labor Income	0.019 (0.099)	0.227** (0.096)	0.035 (0.061)	0.036 (0.024)	0.027 (0.028)	0.140 (0.135)	-0.044 (0.049)	0.059 (0.057)
Ln Other Household Income	0.033 (0.021)	0.009 (0.032)	0.010 (0.016)	0.000 (0.007)	0.001 (0.009)	-0.020 (0.021)	0.002 (0.017)	-0.005 (0.016)
Ln Reference Income	-0.087 (0.098)	0.008 (0.136)	-0.082 (0.053)	-0.110*** (0.031)	-0.143*** (0.040)	-0.138 (0.121)	-0.042 (0.072)	-0.129* (0.069)
Absolute Income Rank Difference	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wife and/or Husband Hospitalized (in t-1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nationality Husband and Wife	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Job Industry Code Husband and Wife	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.134	0.089	0.075	0.037	0.045	0.065	0.046	0.055
Cluster	217	189	370	2229	1509	276	279	388
Observations	1756	1744	3988	31066	19566	3438	3438	4624

**N O T E:** Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged. Life-satisfaction is measured on a scale from 0 (minimum) to 10 (maximum). *Income Share Wife > 0.5* is a dummy which flags primary breadwinner wives. All regressions include age, age-squared and education level (3 categories) of wife and husband. A household head indicator, a flag for households with cohabiting children and region as well as time fixed-effects are included in all estimation. Standard errors are clustered at the individual or couple level and reported in parenthesis.

## 6. Conclusion

Absolute and relative income are vital contributors to what most individuals seek to find, namely happiness. In the context of income comparison, individuals compare to personal income reference points or external benchmarks outside the household, although within partnership comparison is a relevant dimension for research on intra-household allocation. Additionally, gender roles add to within household preference divergence and thereby impact empirical outcomes.

Empirically, the happiness literature finds mixed results for the effect of absolute income and an inverse relationship between reference group income and personal happiness (Luttmer, 2005; Senik, 2009). Underperformance relative to ones reference group is labeled envy effect. Gender identity research analyses the importance of relative income within households. According to Bertrand et al. (2015), gender identity prescriptions influence social and economic outcomes. To avoid gender role reversal, women reduce labor supply (Bertrand et al., 2015). Moreover, female primary breadwinner households report reduced marital quality and an increase in the wife’s relative hours spent on home production. This hints at compensatory behaviour and the need to account for a collective decision model for intra-household allocation, as described in Browning et al. (1994).

Our paper applies the German Socio-Economic Panel and investigates the effect of within household income comparison on individual life satisfaction. The linear, within couple, delta and ordinal fixed-effects estimates suggest envy effects among couples and provide mixed evidence for gender roles to influence subjective well-being. A primary breadwinner wife decreases couple individual happiness by roughly nine per cent. The economic significance of the estimate becomes more evident when compared to external reference group income. An increase in external reference income by approximately 260% corresponds to a similar decrease in couple well-being as having a or being the primary breadwinner wife. The results are robust to choice of estimator, an altered set of control variables, survey design, the inclusion of individuals with no income as well as the inclusion of non-married couples.

In line with preference interdependence and external income comparison benchmarks, our results indicate the influence of within household reference individuals on subjective well-being. Our results are driven by younger individuals, lower education and income households, East German couples and households with a higher full-time employment ratio. The main driver of our effect seems to be a reduced within households salary gap with more frequent prime income contributor changes among younger individuals, fostering role adjustments and envy among male individuals. Additionally, the estimates suggest couple happiness interdependence and greater within household ‘competition’ among wives marginally outearning husbands. Gender identity findings in our setting are mixed. Employment status results hint at gender identity, while other subsamples indicate the contrary. Accordingly, our paper adds to the findings on intra-household allocation, gender identity and happiness mediation dynamics among couples.

Our analysis has important theory and welfare implications. Implications for economic theory are an understanding of the impact of (relative) income on individual happiness, in addition to an approximation of the to be maximised social welfare function via happiness functions (Frey and Stutzer, 2002). In terms of welfare implications, the potential existence of behavioural prescriptions and their effect on individual happiness as well as 'inefficient' intra-household allocations are costly. This holds true in light of relative growth in female salaries and given a potential correlation between well-being and changes in macroeconomic variables (Di Tella et al., 2003).

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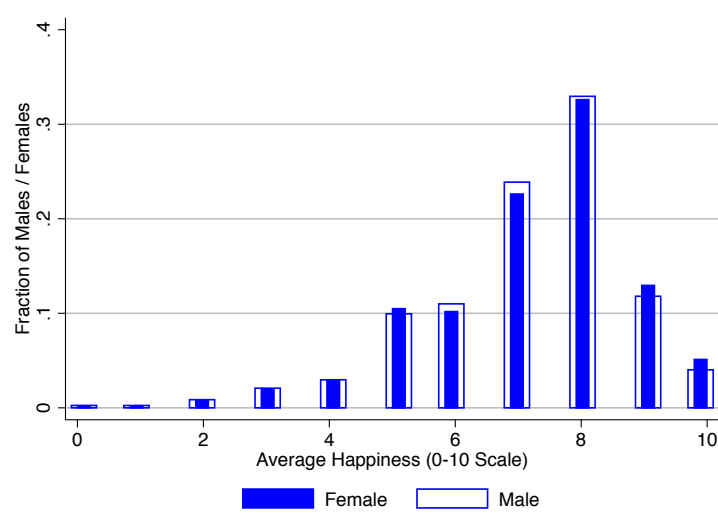
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## Appendix

Table A.1: Variable Definitions

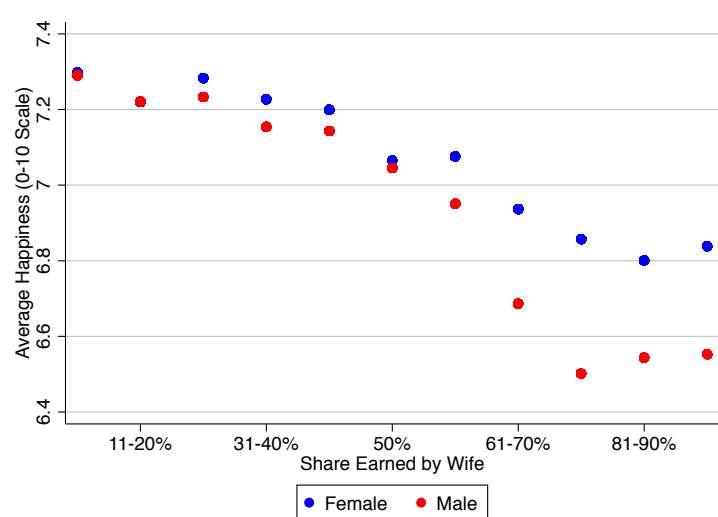
Variable	Description
<i>Dependent Variable:</i>	
Subjective Well-Being	Individual life-satisfaction (measured on a scale from 0 (min.) to 10 (max.))
<i>Income Variables:</i>	
Labor Income	The sum of income from primary job, secondary job, self-employment, 13th month pay, 14th month pay, Christmas bonus pay, holiday bonus pay, miscellaneous bonus pay, and profit-sharing income
Total Household Income	The aggregate of total family income from labor earnings, asset flows, private retirement income and private transfers
Other Household Income	Total post government household income plus taxes minus individual respondent and spouse labor income
Income Share Wife > 0.5	Dummy = 1 if wife's labor income exceeds her husbands
Income Rank Difference	Absolute (yearly) income rank difference of wife and husband in their gender-specific income distribution
Reference Income	Annual income average of similar education, gender, age and regional cells
<i>Other Variables:</i>	
Age	Age of female / male spouse
Age-squared	Age of female / male spouse squared
Education	Categorical Variable (for female / male spouse): 1 = less than high school, 2 = high school, 3 = more than high school
Household Head	Categorical Variable: 1 = husband, 2 = wife
Children	Dummy = 1 if children are living in the household
Child born	Dummy = 1 if a child was born in the past year
Hospitalised	Dummy = 1 if individual was hospitalised (past year)
Self-Reported Health (SRH)	Dummy = 1 if individual reports fair/poor health condition
GDR	Dummy = 1 if individual lived in the GDR before 1989
Employment Status	Categorical Variable: 1 = working full-time, 2 = working part-time, 3 = other employment status
Industry Code Dummies	9 dummies for 1st digit industry code of individual
Nationality Dummies	Dummies for nationality
Occupational Prestige Dummies	Dummies for Treiman Occupational Prestige (ISCO88 based)
State Dummies	16 federal (residence) state dummies
Year Dummies	Dummy variable equal to 1 if year = 2000 etc.

Figure A.1: Histogram - Happiness by Gender



**N O T E:** Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged. Life-satisfaction is measured on a scale from 0 (minimum) to 10 (maximum).

Figure A.2: Scatterplot - Happiness by Gender by Wife's Income Share



**N O T E:** Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged. Life-satisfaction is measured on a scale from 0 (minimum) to 10 (maximum).

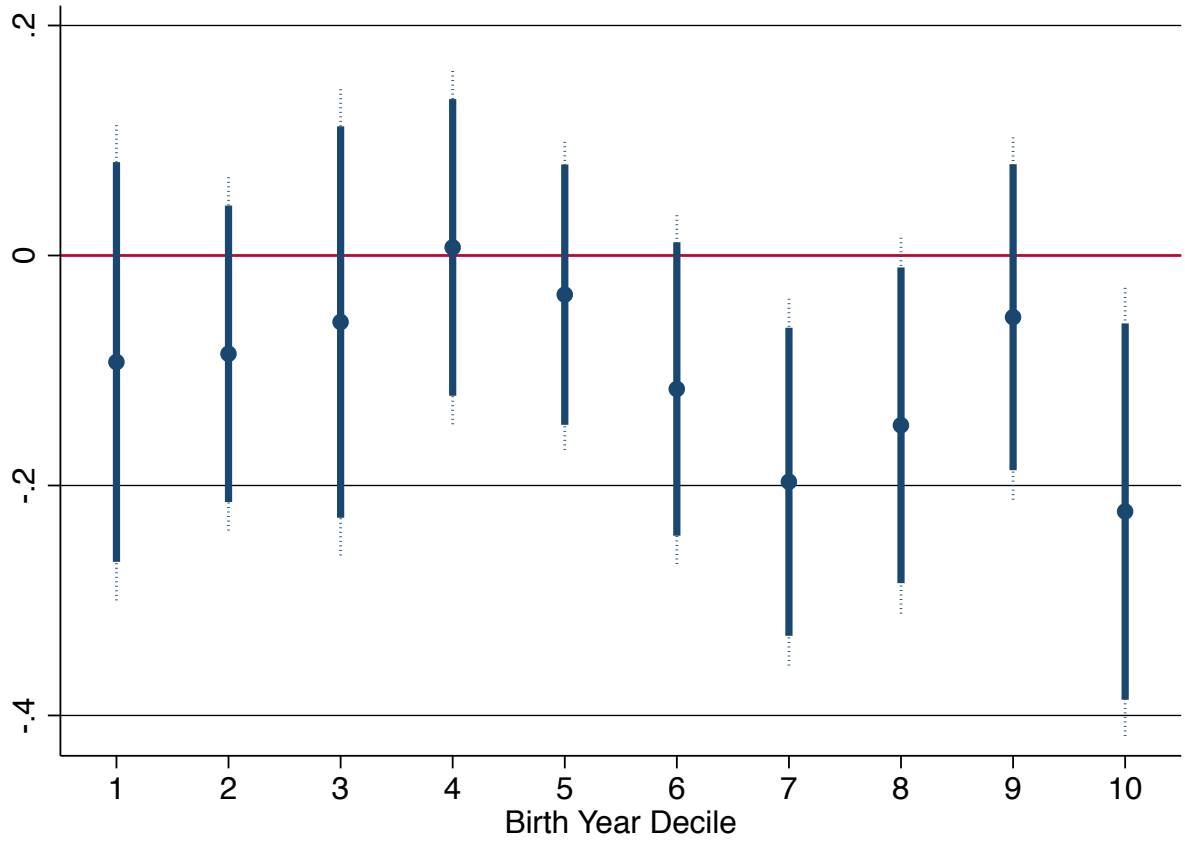


Table A.2: Robutness Estimations - Relative Income &amp; Life-Satisfaction

	Configuration [1] Coef./ (SE)	Configuration [2] Coef./ (SE)	Configuration [3] Coef./ (SE)
Income Share Wife > 0.5	-0.067** (0.030)	-0.081*** (0.030)	-0.078*** (0.030)
R-squared	0.045	0.036	0.036
Cluster	2547	2709	2676
Observations	34394	37934	34971
	Configuration [4] Coef./ (SE)	Configuration [5] Coef./ (SE)	Configuration [6] Coef./ (SE)
Income Share Wife > 0.5	-0.099*** (0.035)	-0.054** (0.027)	-0.063** (0.028)
R-squared	0.045	0.039	0.038
Cluster	2588	3613	3049
Observations	37364	56642	42260
	Configuration [7] Coef./ (SE)	Configuration [8] Coef./ (SE)	Configuration [9] Coef./ (SE)
Income Share Wife > 0.5	-0.094** (0.041)	-0.113*** (0.042)	
Delta Income Share Wife > 0.5			-0.074* (0.038)
Lag (t-1) Income Share Wife > 0.5			-0.076 (0.065)
Log Likelihood	-62659	-62443	
R-squared			0.110
Cluster	2727	2727	1979
Observations	38554	38554	27622

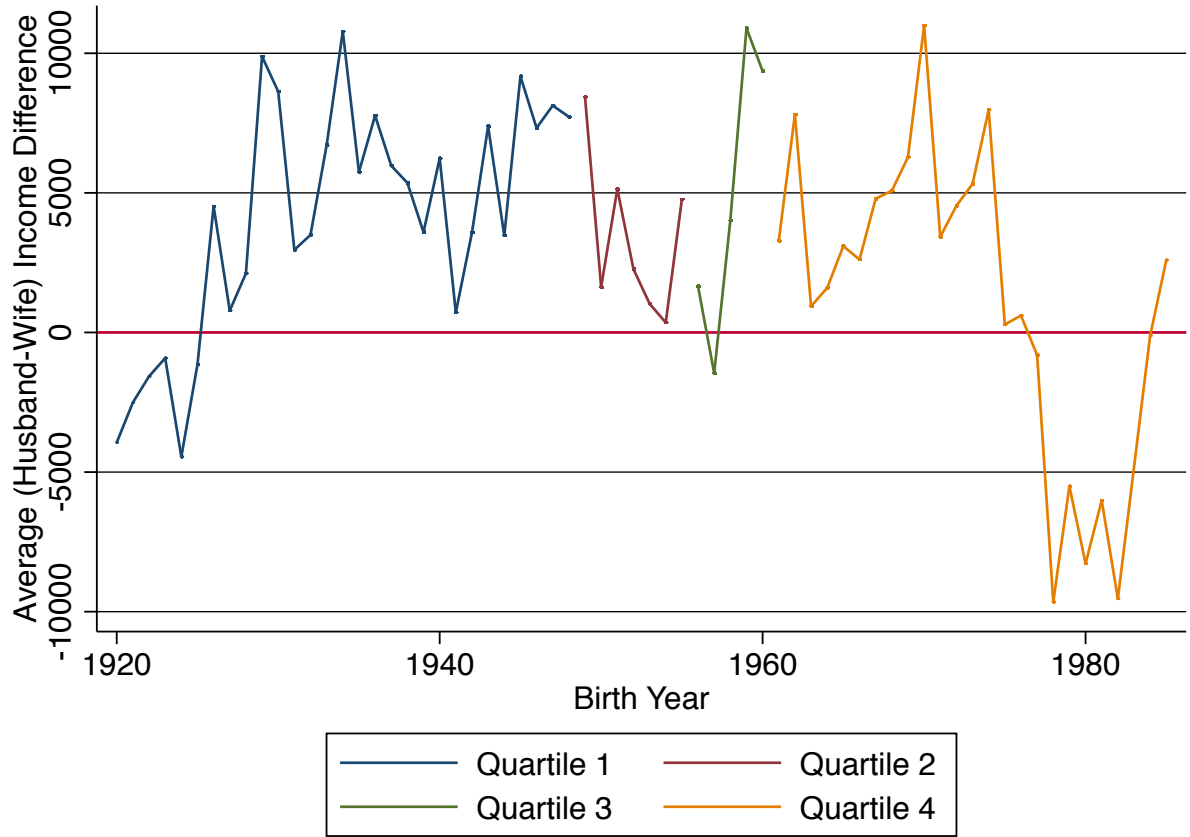
**N O T E:** Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged. Life-satisfaction is measured on a scale from 0 (minimum) to 10 (maximum). *Income Share Wife > 0.5* is a dummy which flags primary breadwinner wives. All regressions include age, age-squared and education level (3 categories) of wife and husband. A household head indicator, a flag for households with cohabiting children and region as well as time fixed-effects are included in all estimation. Standard errors are clustered at the individual or couple level and reported in parenthesis. Configuration [1] - [3] are control variable related robustness checks (self-reported health, occupational prestige and recent birth of child). Configuration [4] is a weighted estimation, i.e. technical robustness check. Configuration [5] and [6] are sampling robustness checks, i.e. at least one household member has positive income and couples are married or cohabiting. Configuration [7] (RE-Ologit) and [8] (CRE-Ologit) show ordinal estimates. Marginal effects are not reported. Configuration [9] depicts a delta couple estimation, i.e. happiness estimated as function of changes in the couple's income share.

Figure A.3: Income Share Wife  $> 0.5$  - Coefficients & Confidence Intervals by Birth Year Decile



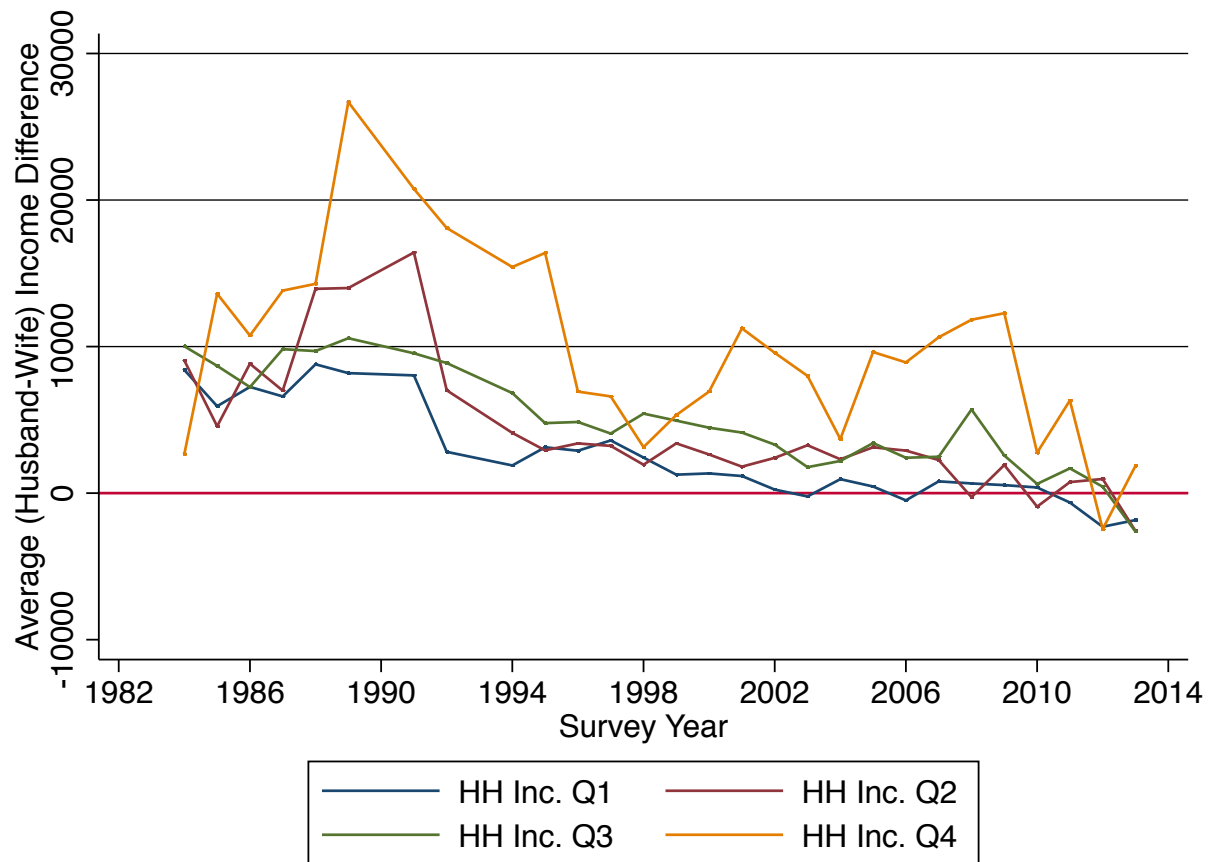
**N O T E:** Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged. Confidence intervals are 90 (solid line) and 95% (dotted line).

Figure A.4: Average (Husband & Wife) Income Difference by Birth Year Quartile



**N O T E:** Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged.

Figure A.5: Average (Husband & Wife) Income Difference by Total Household Income Quartile



**N O T E:** Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged.

Figure A.6: Average Happiness by Wife's Income Share



**N O T E:** Sample: (G)SOEP 1984 - 2013. Our sample includes married couples, aged between 18 and 65 years of age, who report individual life-satisfaction. We require couples to report positive labor income, prime income contributor changes and couple households to remain unchanged. Life-satisfaction is measured on a scale from 0 (minimum) to 10 (maximum).

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