Written Exam Economics — Winter 2017-2018

Family Economics

Suggested Answers

Practical Information

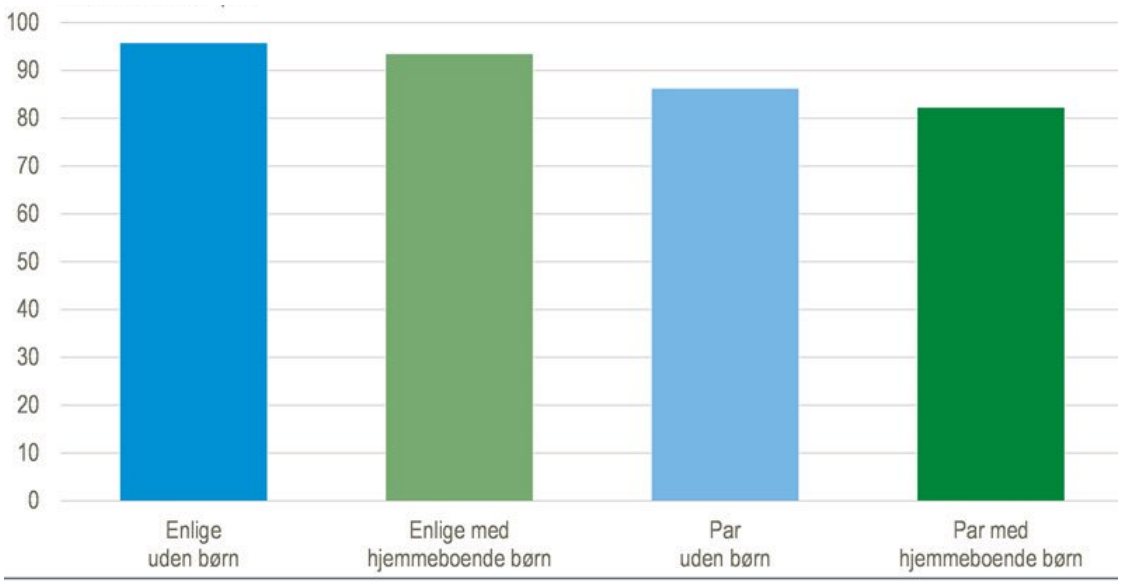
Note the following formal requirements:

- This is an *individual* examination. You are not allowed to cooperate with other students or other people. Student collaboration is considered to be cheating.
- This exam consists of 5 questions. Please answer all questions.
- You must follow the following formal requirements:
  - The **written** part of the exam paper, including all headers but excluding additional figures, should not exceed **10 standard pages**: DinA4, font size set to 12, line spacing set to 1.5, margins (left/right/top/bottom) of at least 2 cm. All pages must be numbered consecutively.
  - You may use up to 2 DinA4 pages for additional figures.
- Tables and figures displayed in the exam paper should be formatted appropriately (i.e., they should have captions, axes should be labelled, a legend should be added when required, a note describing the source, variables and the sample, etc.).
- You should not write your name on the material you submit (exam paper, computer program, supporting material).

Female wages: relationship status and family type

In 2016, the average wage earner in Denmark (excluding individuals under the age of 18 and students) had a monthly wage income of 40,950kr. There were significant differences of average wages by gender, and by family status. Men's average wage was 43,647kr, whereas women's average wage was 37,895kr. Figure 1 shows average gender differences in different demographic groups: The average wage difference between men and women was largest among couples with resident children (i.e., children living with them in the same household), and smallest among childless single men and women. Women with resident children and who lived in a relationship earned on average 82 pct of men in the same category. Women who lived in a relationship but had no children earned on average 86 pct. of men men in a relationship and without children. Single women with and without children earned on average 93 pct. and 96 pct. of single males' monthly wages (with and without children), respectively.

Figure 1: Female/Male Monthly Wage Income, by Relationship Status and Family Type, 2016.



Source: **http://www.dst.dk/da/statistik/nyt/NytHtml?cid=24968&place=twitter** (Statistics Denmark).
Notes: Shown is the ratio of average female monthly wage income as a percent of male wages (100), for males with the same relationship status category.
Translations:
"Enlige uden børn" = Single without children;
"Enlige med hjemmeboende børn" = Single with resident children;
"Par uden børn" = Couple without children;
"Par med hjemmeboende børn" = Couple with resident children.

Questions

Note: Not all questions require equal amounts of work. A very rough guide to the time you may want to spend:
Question 1) 5%, Question 2) 10%, Question 3) 35%, Question 4) 25%, Question 5) 25%.

Question 1

Describe what you need to know about the data entering this graph to be able to interpret it. Be both precise and exhaustive.

Suggested answer

This should cover aspects like the characteristics of the underlying populations (education, age restrictions, place of residence), their labor market status, and the timing of measurement.

- Ages included, age distribution
- Educational attainment of men and women in each category
- Jobs: full-time or part-time?
- Stock vs flow: Is this a gap at a single point in time or long-term (wage measure in a single year vs lifetime earnings)?

Question 2

Are women living with a partner *absolutely* worse off than single women? Why can we not conclude this from Figure 1? Think of both income and consumption in the household.

Suggested answer

- Ratios do not tell us about level in income. We would need to know levels of women's earnings in the different family groups.
- We expect couples to display some amount of consumption complementarities. This could stem from public goods within the household (which lower the total expenditure of consumption when it is bought/shared by two individuals jointly rather than as

singles). Complementarities could also arise from scale economies. Research on equivalence ratios has estimated the equivalent income needed to replicate 2 consumption bundles of singles ranges from 1 (Lazear and Michael, 1980) to about 1.4. (Browning, Chiappori and Lewbel, 2003). "Expert scales" range from 1.4 to 1.7, meaning that a couple would need only 1.4-1.7 times a single's income to consume the same as two singles.

Therefore, even absolute incomes of single women vs those in couples need to be adjusted for the fact that there are consumption complementarities in couples, and that a given budget (in kroner) can purchase more consumption in a couple than for a single.

- Utility is possibly derived from commodities (not just goods); and these commodities may be produced in the household with both goods (purchased with monetary income) and time. Example of important commodities that require both these inputs are leisure and children. Therefore, monetary income does not give us in itself the relevant consumption amount. Specifically, with specialization (see below), it is likely that a household can produce more of those commodities than a single.
- There may also be leisure complementarities that increase the utility of women in couples relative to singles.
- Even if we take into account all previous points, it is impossible to know ex ante how the joint production of commodities is shared.

Question 3

Relate the graph to the following two theories covered in Becker's "Treatise on the Family." How do they explain the larger gender wage gap in couples vs singles?

Question 3.1: Specialization within the household.

(a) Lay out the basic structure.

(b) What can the theory say about a gender gap favoring *males*?

(c) Then move to the *larger* gender gap in two-person households versus singles. Evaluate the model's ability to explain the gap considering appropriate empirical facts.

Suggested answer

a)

In "A Theory of the Allocation of Time," Becker sets up a model where ex-ante equal agents may find it beneficial to produce commodities they consume together - this usually requires the ability to make credible commitments, enforce effort provision etc. In his set-up, production complementarities arise when households combine time and market goods to produce commodities, and human capital is sector-specific in two ways: the types of human capital increase productivity in the corresponding sector only, and it increases from time spent in that sector. The decision to allocate time to each sector is done within the household on the basis of comparative advantage. If both members of the household have a greater stock of human capital in one sector than in the other, they have different comparative advantages. According to Becker's Theorem 2.1, at most one member would allocate time to both the market and household sectors.

This implies that when households are made up of one man and one woman (you may find data on this), and the specialization in either the market or household follows gender lines, it is possible to link gender gaps to specialization. Begin with this discussion before moving on to different magnitudes of the gap by single/partner status.

b)

Note that Becker's prediction of who specializes in which sector is not gender-specific. It only depends on (small) differences in human capital, or comparative advantage. So a theory of specialization would only predict wage differences between member 1 and member 2 within a household (which is different from what Figure 1 shows). The difference would follow specialization, which itself would follow existing human capital differences. What can we say about existing human capital differences?

- Danish women tend to be more highly educated than men in recent cohorts. Formal education is often taken as a marker for labor-market relevant human capital. In that sense, holding constant the other type of human capital we should expect specialization of women to the market sector (on average), with men specializing in the household (and one of them possibly working in both sectors - but women would in any case gain more labor market experience, and should therefore have higher wages).
- Do women on average have higher human capital in the household? We may be reluctant to argue for this in very general terms. There may be a case though that drives the observations in the data at least partly: One may have in mind children, where mothers tend to spend more time in the household with newborns

in the early weeks - due to maternity leave regulation (obliging mothers to stay at home), breastfeeding etc. Those early differences could engender specialization in this domain. But note that the gender gap is larger not only in couples with children, but also without children.

Overall this theory may have trouble to explain why specialization would be as gendered as it would be needed to explain Figure 1.

c)

If women *in couples* are more likely to specialize in the household than men, their labor-market specific human capital would decrease relative to men. This would lead to a gender gap in couples that reflects human capital differences from specialization (away from the labor market for women, towards the labor market for men). This specialization is not observed in singles, so their labor-market specific human capital does not fall relative to single men.

Why would we observe the specific gender-aligned specialization even in couples without children? This category may include older couples, whose children are no longer living at home. If a significant share of them had children earlier, the average may reflect the human capital accumulation over time. Since once there is a comparative advantage, specialization tends to exacerbate these early differences.

Alvarez and Miles (2003) show that equalizing characteristics of women and men would only increase the probability of equal housework by 7%, using an Oaxaca-Blinder decomposition on a 1991 Spanish time use survey. While more educated/higher income women spend less time in the household than their less educated/lower income peers, men's time in the household is unaffected by their characteristics (absolute and relative). Thus, despite Becker's theory being gender-neutral in principle, observed time spent in the household shows that men invest less in their household-specific human capital, instead reinforcing their comparative advantage in the labor market. To the extent that these labor-market specific human capital differences between genders are reflected in wages, specialization within the household can explain a larger gender gap in (specialized) couples than in singles.

Question 3.2: Negative assortative mating.

(a) Describe the basic structure and theorems for assortative mating (positive or negative).

(b) How could negative assortative mating explain the larger gender gap in couples than in singles? Again, evaluate whether this explanation corresponds to real-life facts.

Suggested answer

a)

- Becker describes how stable matches in the marriage market arrive: concept of match quality; individuals only enter match if gains exceed costs. Gain come from commodity production.
- Whether positive or negative matching depends on which pairing of "production factors" in the couple maximizes aggregate commodity output.
- Positive assortative mating: high quality men marry high-quality women; this is optimal when the function Z(x; y), commodity production with individual characteristics x and y, is super-modular. The characteristics are complementary.
- The number of individuals on each side of the market determines who stays single in the positive/negative assortative matching cases.

b)

There are two perspectives, which are two sides of the same coin, how negative assortative mating can predict larger wage differences between men and women in couples than singles; this "coin" is who marries whom in terms of potential wages, and who stays single.

- When the characteristics x and y are potential wages, and for some reason (discussed right below) matching along this dimension was optimally negatively assortative in the sense that high-wage men marry low-wage women, who stays single? Low-wage men and/or high-wage women (note that Becker only considers "or" - the larger group of the market stays single). That means that we should actually see a reverse gender gap among singles according to this explanation.
- Among the married men and women, which is a selected sample, we would observe low wages in women and high wages in men. This would generate a large gender gap in this group (even if wages between men and women were equal on average).
- Why would matching be negatively assortative in terms of wages? Recall our discussion of page 115 in Becker's *Treatise*: wages enter the commodity production both as a productive input (buying the goods to produce the commodities), and as a cost (time is costlier the higher wages are). *Because of this double function of wages,* Becker argues that when couples are equal in all other characteristics other than wages, we *should tend to see negative assortative mating* in terms of wages, in general, so that couples can benefit from gains to specialization.

- How likely is it that matching is negative in terms of wages? It has been observed that "like tends to be with like" in terms of education and human capital. This was highlighted in, for example, Nielsen and Svarer, 2004 or Dupuy and Galichon, 2014. Since wages are related to human capital and education, there is a positive correlation of wages in couples (Nakosteen, Westerlund, Zimmer, 2004). Does this mean that Becker's theory is contradicted? No, because his assertion rests on the condition that couples are alike in all other characteristics. Furthermore, note that current research highlights the multi-dimensionality of matching. Individuals can trade off one characteristic with another, such as increasing education to make up higher BMI (you could elaborate on Dupuy and Galichon, 2014 or Chiappori, Oreffice, Qintana-Domeque, 2012).

*Note that you may start with how these theories explain a gender gap, but this question is ultimately about the **larger** gap in **dual-person households** vs singles. (The next question (4) will address differences between families with and without children.)*

Question 4

The family gap: The gender wage gap is larger for couples with children than for couples without children. Discuss potential explanations for this finding based on relevant existing empirical research (cite and discuss explicitly). Also comment on the magnitude of the family gap in Figure 1. Pick at least 3-4 relevant studies and discuss their empirical challenges, their strategies and findings.

Suggested answer

The wage gap is largest for women with children (both in the single group and dual-adult group.

Explanation for larger gap for women with children - organize your discussion along some structure, for example the one we had in the class on the family gap:

- Discrimination
- Human Capital
  - education (level, type/field). Maybe future mothers' investment patterns differ (may invest less in human capital because they expect lower returns)
  - experience (on-the-job training), tenure (specific Human capital). May be lowered from longer absence: for the time off the labor market, note the role of leave policies, tenure, discrimination. Type of child care etc also matters.

  - unobserved quality, motivation

- Occupations (wage distribution, level, flexibility, public/private). Note the difference between selection prior to childbirth and afterwards.
- Match quality

For the list of articles available, see the bibliography and lecture slides. Suggestions are

- Datta Gupta, Smith, and Verner, 2008: Perspective Article: The Impact of Nordic Countries' Family Friendly Policies on Employment, Wages, and Children
- Waldfogel, 1998: Understanding the "Family Gap" in Pay for Women with Children
- Lundberg, Plug, and Wurtz-Rasmussen: Can Women Have Children and a Career?
- Oaxaca, 1973: Male-Female Wage Differentials in Urban Labor Markets
- Simonsen and Skipper, 2012: The family gap in wages: What wombmates reveal
- Simonsen and Skipper, 2006: The Costs of Motherhood: An Analysis Using Matching Estimators
- Nielsen et al, 2004: Does the Gap in Family-Friendly Policies Drive the Family Gap?

Finally, note that there is not only selection of females into marriage, but also a selection of males that we compare the females with - maybe high quality (low quality) males in couple (single) state. You could discuss the literature on the studies of gains to marriage, whether the observed higher earnings for married males are selection or causally driven by marriage.

Question 5

Describe 1-2 additional pieces of data that would allow you to assess Figure 1 in light of the previously discussed theories. You may either add 1-2 tables or graphs (be sure to carefully read the requirements stated in "Practical Information" on page 2), or describe what type of data you would like to have to explore implications of the theory. In the second case, give a precise expectation on the basis of prior knowledge, empirical and theoretical. Choose data that is relevant: does it support the theory as an explanation of the observed gaps? Or would it indicate that the theory is not a prime explanation? Does it help us understand the topic in a more nuanced way? Discuss the data in relation

to the theory and the course material.

(If necessary, you may draw on data from policy briefs presented during the course, but you should acknowledge the source, and provide independent analysis. Mere repetition will not be sufficient, and you are encouraged to extend the analysis with new data or interpretation angles.)

Suggested answer

Here, the individual answer will vary from student to student. The assessment will be based on relevance, the articulation of the link between data and theory, and the breadth of knowledge demonstrated in the discussion. The answer may draw on data from policy briefs presented during the course, but should acknowledge the source, and provide independent analysis.

An example topic could be:

Specialization within the household: Time use data could help to show whether women focus on home production

- Time use studies in the course material suggest that housework is performed mainly by women (even for couples who according to theory should allocate time differently - highly educated women)

Assortative mating: Data on highest level of education/educational differences in couples