Instructor: **Dr. Laura Turner** (Laura)

Office hours: Kaneff 3262, Th 3:15-5:30pm or by appointment

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Class hours: Tuesday, 1:10-3:00 pm, DH 2060


Any additional readings will be provided on Blackboard
Evaluation

1. Five assignments (due dates are on syllabus)
   
   ▶ Highest counts for 30%; others 15% each
   
   ▶ Late assignments beyond allotted “late days” penalized 4% rate per day, including weekends
   
   ▶ Students are allowed a combined 30 “late” days beyond the suggested submission dates on syllabus.
   
   ▶ Group work is fine but with a small penalty (see syllabus)

2. In-class quizzes: 10-12%
   
   ▶ 7 one-question quizzes, worth 2 points each
   
   ▶ 1 point for attempting the question and 1 point for getting it right

- Becker largely pioneered the “post-Malthusian” field of family economics
  - Malthus’ model of population growth, in which population growth tracks income growth, broke down in second half of 19th and the 20th C
Some of the issues addressed in the course and in the *Treatise*

1. The family optimization problem
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   ▶ Are there economic explanations for “traditional” gender roles? What about for the *erosion* of traditional gender roles?
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- Male / female wage gaps?
  
  - Small intrinsic differences between men and women or small effects of discrimination can have huge consequences if productivity depends on optimal investments in human capital
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2. Who marries who and why?
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   - What determines equilibrium sorting in marriage markets? Is this sorting **efficient** in an economic sense?
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- Why are monogamous marriages the norm? Who benefits from monogamy?

- What explains the historical decline of polygamous and the relative absence of polyandrous marriages?

- What determines equilibrium sorting in marriage markets? Is this sorting efficient in an economic sense?
  - Yes: under some conditions, the privately optimal sorting of partners maximizes aggregate output/utility
  - In an efficient marital sorting, it is not possible for a swapping of partners to make somebody better off and nobody worse off (Pareto efficient)
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3. Children and intergenerational mobility
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  - Strategic intergenerational relationships: game theory applications, e.g. merit goods
  - Altruism within families: the “Rotten Kid Theorem”
Some of the issues addressed in the course and in the Treatise

4. Divorce and the life cycle of the family

▶ Why do people divorce? Is divorce consistent with rational preferences or rational expectations?

▶ How do couples reconcile individual and group incentives in the absence of altruism?

▶ Unitary vs. collective models of the household

▶ Can members of couples contract or "commit" to avoid divorce?

▶ What is the role of the modern welfare state in determining family formation and dissolution? Policy implications?
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An application of family economics: parents “the prodigal son”

- Basic idea: Parents and children may have very different ideas for the optimal behaviour of children, creating an intergenerational struggle
  1. Parents want to control their children to maximize their “gains” from parenting
  2. Children want to receive transfers (gifts and bequests) from parents
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Concepts:

1. Intergenerational conflict and strategic interaction
2. altruism
3. dynamics
Parents’ preferences

- Parents are altruistic with preference function $V(\cdot)$ defined over:
  1. Their own consumption $x_3$
  2. children’s utility $U$

- So: $V(\cdot) = V(x_3, U)$ with $V_{x_3} > 0$, $V_U > 0$
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- So: $V(\cdot) = V(x_3, U)$ with $V_{x_3} > 0, V_U > 0$

- Technical note: in the lecture notes and the book, you’ll see the first derivatives of a given function $U(x, y)$ with respect to $x$ and $y$ written interchangeably as $U_x \equiv \frac{\partial U}{\partial x}$ and $U_y \equiv \frac{\partial U}{\partial y}$. The equivalence symbol $\equiv$ means that the two expressions mean the same thing.
Children are **selfish**, with preference function $U = U(x_1, x_2)$, with $U_{x_1} > 0$ and $U_{x_2} > 0$ and:

1. $x_1$ is their consumption when young
2. $x_2$ is their consumption when older
Setting up the story I

- Each good $i = 1, 2, 3$ costs $p_i$ with $p_1 = 1$ (a normalization).

- Parents have income $I_P$ and can give part of this as a gift $g$ to their children. Catch: $g$ can only be spent on $x_2$.

- Children have their own income $I_c$ which they spend on themselves: on $x_1$ and $x_2$. 
V(.) and U(.) are standard/well behaved preference functions in the following sense:

1. we can always take their derivatives
2. they are increasing in each argument: more of $x_i$ is always better
3. they are concave in each argument: the *marginal* utility of $x_i$ is decreasing as $x_i$ increases, holding other arguments of $U$ and $V$ constant
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Almost all utility functions we encounter in economics have these three properties, which keeps the math simple.
Parents and their children play a three-stage game:

1. Children choose the amount of consumption when young $x_1$
2. Parents observe child’s choice of $x_1$ and choose $g$ and $x_3$
3. Children receive $g$ and choose the amount of consumption when old $x_2$
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- Solve by **backward induction**: solve the child’s problem at stage 3; then the parent’s problem at stage 2; then the child’s problem at stage 1.

- In later stages of the “game”, individuals take choices made by themselves or others in earlier stages as given
Final stage: children receive $g$ and consume $x_2$

- After receiving $g$, children have total income $l_c + \bar{g} - \bar{x_1}$ where bars indicate that these choices have previously been made ($g$ by parents and $x_1$ by children) and are now taken as given.

- Since $U$ is always increasing in $x_2$ (technically, there is non-satiation in $x_2$), children spend their whole remaining income on $x_2$, i.e.

$$p_2x_2 = l_c + \bar{g} - \bar{x_1}$$
Second stage: parents choose $g$ and $x_3$

- Parents have income $I_P$ and choose how much to spend on $x_3$ and how much to give as a gift (or bequest) $g$ to their children, given that their children have chosen $x_1$ at the first stage of the game.

- To solve this problem, write out the parents’ Lagrangian with Lagrangian multiplier (shadow value of resource constraint) $\lambda_P$:

\[
\mathcal{L} = \max_{x_3, g} V(x_3, U(x_1, x_2)) + \lambda_P [I_P - p_3 x_3 - g]
\]

- First order condition (FOC) for $x_3$ is standard: \( \frac{\partial V}{\partial x_3} - \lambda_P p_3 = 0 \)

- FOC for $g$ is \( \frac{\partial V}{\partial U} \frac{\partial U}{\partial x_2} \frac{\partial x_2}{\partial g} - \lambda_P = 0 \)

- By dividing out $\lambda_P$ and using the fact that \( \frac{\partial x_2}{\partial g} = \frac{1}{p_2} \), we get:

\[
\frac{\partial V}{\partial x_3} p_2 = \frac{\partial V}{\partial U} \frac{\partial U}{\partial x_2} p_3
\]
Alternatively, we can use the fact that parents will use up all of their income on $g$ and $x_3$ (why?) to rewrite the parents’ optimization problem as:

$$\max_g V\left(\frac{I_p - g}{p_3}, U(\bar{x}_1, \frac{l_c + g - \bar{x}_1}{p_2})\right)$$

(1)

Solving (1) for $g$ such that $\frac{\partial V}{\partial g} = 0$, easy to find the FOC:

$$\frac{\partial V}{\partial x_3}/p_3 = \frac{\partial V}{\partial U}/\frac{\partial U}{\partial x_2}/p_2$$

exactly as on the previous slide using the Lagrangian.

Note: because utility is well-behaved and the budget constraints are linear, we know our FOC describes a maximum rather than a minimum.
First stage: children choose $x_1$

- Children buy and consume $x_1$ taking account of their life-time income constraint: $l_c + g(x_1) = x_1 + p_2x_2$:

$$\mathcal{L} = \max_{x_1, x_2} U(x_1, x_2) + \lambda_c[l_c + g(x_1) - x_1 - p_2x_2]$$

(2)

- FOC for $x_1$ is:

$$\frac{\partial U}{\partial x_1} - \lambda_c[1 - \frac{\partial g}{\partial x_1}] = 0$$

- ...or substituting for $\lambda_c$ (using the FOC for $x_2$ which we can derive from (2)):

$$p_2 \frac{\partial U}{\partial x_1} = \frac{\partial U}{\partial x_2} \left[1 - \frac{\partial g}{\partial x_1}\right]$$
Children’s FOC for $x_1$ differs from the “standard” FOC by the term $(-\frac{\partial g}{\partial x_1})$.

Suppose $\frac{\partial g}{\partial x_1}$ is positive. Then at the child’s optimal $x_1$, $\frac{\partial U}{\partial x_1}$ is lower than it would be in the absence of $g$. Since $U$ is concave in $x_1$, this in turn implies that the child’s optimal $x_1$ is higher, and children consume more when young than they would if $\frac{\partial g}{\partial x_1} = 0$.

This is what is known as the “prodigal son” problem!
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Questions:

1. Why do we expect that it is in fact the case that $\frac{\partial g}{\partial x_1} > 0$?

2. From the point of view of a social planner who cares equally about the welfare of children and parents, are the choices of $x_1$, $x_2$ and $g$ likely to be efficient?
A social planner (in this case a family planner) has a social welfare function $S(U, V)$ where $S$ is the planner’s “utility” or objective function, which depends on the welfare of the children and the parents.

If the social planner cares equally about the parents and the children, then the obvious candidate for $S$ is:

$$S(U, V) = U(x_1, x_2) + V(x_3, U)$$

Since the planner is happiest if he can maximize the sum of parents’ and children’s welfare, it makes sense for him to assume an equally weighted sum of their own preferences.
Typically, we assume the planner could control the resources in the family but not increase them.

He allocates $I_c$ and $I_p$ so as to maximize $S$, a constrained optimization problem similar in structure the ones solved by the parents and children.

Note that the family doesn’t determine the prices of the goods, so the planner must take them as given just like the family members (parent and children) do.

“Social efficiency” means that the $x_1$, $x_2$ and $x_3$ of the family members coincide with the choices of $x_1$, $x_2$ and $x_3$ of the planner. This is the same as saying that the children and parents playing the three-stage game make the choices that maximize their joint welfare.
The prodigal son problem arises because children exploit their parents for resources and therefore lower their parents’ utility.

This exploitation could be reduced (at the cost of some complications to the algebra) if children are also altruistic toward their parents.

Another way of solving (or at least mitigating) the prodigal son problem is if $x_1$ is a merit good: that is a good that provides direct utility to parents.

- See the discussion in Becker Introduction: note that $x_1$ and $x_2$ are reversed there.
In the presence of merit goods, the parental utility function becomes:

\[ V \equiv V(x_3, U, x_1) \]

Note that the “merit good” \( x_1 \) provides utility to parents in two ways:

1. directly, as an argument of \( V \)
2. indirectly through its effect on \( U \)

In our story, merit goods are equivalent to “consumption when young”. Parents may get direct utility from their kids’ consumption while the kids are living with the parents so that they “enjoy” being exploited by their kids.

Alternatively, we could think of \( x_1 \) as being a specific thing, like marrying rich, that both parents and their kids like.
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Note that the “merit good” \( x_1 \) provides utility to parents in two ways:

1. directly, as an argument of \( V \) – bragging to my friends that my kid married a rich doctor

2. indirectly through its effect on \( U \) – I am happy that my kid is happy that he married a rich doctor
Other interpretations of the problem are also possible, with minor variations in the formulation. Suppose it is $x_2$ (adult or stage-3 consumption) rather than $x_1$ that is the merit good to parents. In this case, would the existence of the merit good solve the prodigal son problem (the disharmony between what parents want and children want) or make it worse?

What if parents and children can *contract* on a level of $x_1$ and $g$? Would such an (informal) contract be credible?

What if, at stage 1, children choose between two goods $x_1$ and $y_1$ where $x_1$ is the merit good and $y_1$ a regular (non-merit) good. Would children have an incentive to consume more of the merit good than they would if parental transfers were fixed?
The simple model of intergenerational transfers has implications for (1) relative power of rich vs. poor parents over their children (2) intergenerational mobility (3) “battle of the generations”, just to give a few examples of concepts we will encounter later in the class.

Though simple, it is also a very flexible model, which is good and bad. Part of the goal of economists is to write tractable models that capture basic ideas about what people want and how and make decisions, together and separately. Another goal is to test these models to see which variants are most consistent with evidence from the real world.

Is the prodigal son problem a real problem? Do merit goods really exist?

In ECO 433, we will mostly be looking at the theoretical side: but always remember that a model is only as good as its predictions!