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Wealth Effects and Labor Supply: An Experimental Study

Deniz Nebioglu [1], Ayca Ebru Giritligil [2]

[1]MEF University, Bilgi Economics Lab of Istanbul

[2]Istanbul Bilgi University

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News Driven Business Cycle

- Expectations about future economic fundamentals is one of the main determinants of business cycle fluctuations. (Pigou [1927], Cochrane [1994]), Beaudry and Portier [2006])

- **News driven business cycle**: An episode where consumption, labor, investment and stock prices increase with the output level following a positive news about future productivity.

- Need for models which generates comovement of macroeconomic variables in response to news shocks.

News Driven Business Cycles, RBC and Comovement Puzzle

Good news about future productivity hits the economy.

Agents feel themselves wealthier.

They increase their leisure and consumption demand.

No change in labor demand as marginal product of labor is constant.

Output and Investment drops.

JR Preferences as a Remedy to Comovement Puzzle

- Jaimovich and Rebelo [2009] offer a generalized preference specification consistent with a balanced growth path which nests King et al. [1988] and Greenwood et al. [1988] preferences as extreme cases.

- Greenwood et al. [1988] (GHH) preferences is a quasilinear utility function which implies that the wealth effect on labor supply is zero and leisure is not a normal good. The marginal rate of substitution between consumption and labor effort is given by:

$$MRS_t = -\frac{U_2(C_t, G(L_t))}{U_1(C_t, G(L_t))} = G'(L_t)$$

Motivation

- Objective of the paper: to test the existence of short run wealth elasticity of labor supply using experimental economics methodology:

- Controlled environment is useful to create an exogenous change in unearned income

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Mixed Evidence within DSGE Framework

- Schmitt-Grohé and Uribe [2012]: No wealth effects in the short run.
- Khan and Tsoukalas [2012]: Substantial wealth effects in the short run.
- Gali et al. [2011]: The estimated wealth elasticity of labor supply changes dramatically when the set of observable variables is changed.
- Nebioğlu [2016]: Estimation procedure can not identify the wealth elasticity parameter.

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Related Literature: Microeconometric Evidence

- Field data reflect a variety of environmental factors:
    - Finding an exogenous measure of income is difficult.
        - Spousal or property income is used as exogenous measure of unearned income: **Leisure is an inferior good.** (Pencavel [1987] and Blundell and Macurdy [1999] Killingsworth and Heckman [1987])
        - Bequests, inheritances, lottery prizes and changes in the price of housing as exogenous measure of unearned income: (Holtz-Eakin et al. [1993], Brown et al. [2006], van Huizen [2014], Imbens et al. [2001], Kimball and Shapiro [2008]): **Leisure is a normal good.**
    - People do not usually have freedom to adjust their working hours.
        - Focus on labor supply responses in settings where workers are free to set their working hours.
        - Labor supply of NY taxi drivers: Camerer et al. [1997]: **Income effect due to increased wages is large.** Farber [2005]: **Income effect due to increased wage is small.**

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Why it matters for macroeconomics?

- Macroeconomic models are not only used to interpret the causes of short run fluctuations in the economy but also to write policy prescriptions to stabilize the economy.

- Labor/leisure preferences of individuals is one of the main determinants of aggregate supply part of the model. The suggestions and the policy implications of a macroeconomic model might depend very much on the assumptions on the utility function employed.

Why it matters for macroeconomics? Cont'd

- Two examples from the literature:
  - Monetary Policy: Accommodate or Not?
    - Smets and Wouters [2007] points out wage mark-up shocks as an important driver of output fluctuations. Monetary Policy Reaction required!
    - Gali et al. [2011] assumption of GHH preferences and inclusion of unemployment in the set of observables shows that labor supply shocks are important. Accomodative Monetary Policy.
  - Monetary Policy Reaction: How much?
    - Dey [2014]: Modifying an otherwise standard model with GHH preferences results in amplified responses of output, marginal cost and inflation following a monetary policy shock.
    - Increase in interest rates: drop in consumption: with standard preferences labor supply increases through wealth effects. (creates an offsetting effect, labor moves countercyclically)
    - Model fails to generate inertial responses of inflation and output
    - If as a policy advisor, you use this model to suggest monetary policy stance, you would overestimate the effect of a 1 percent change in the interest rates.

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Eliciting agents' innate preferences for income and leisure

- In neoclassical labor supply model, labor supply is defined as the time allocated to working given the time endowment. However, creating the intensive margin of labor supply decision in the lab is very difficult, if not impossible.

- Nebioğlu and Giritligil [2015] documents the results of a series of real effort experiments which try to create labor/leisure trade-off using a neoclassical production framework and concludes that in an individual decion making framework, creating labor/leisure tradeoff along the intensive margin poses a methodological difficulty.

- The cost of effort in the lab is overshadowed by the opportunity cost of being in the lab: Measure extensive margin of labor/leisure choice.

- Measure wealth effects on labor supply as an increase in the reservation wages.

- Eliciting pure labor/leisure preferences can be implemented by employing a market mechanism.

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Outline of the Design

- Focus on the extensive margin of the labor supply.
- Measure subjects labor/leisure preferences as the value they attach to their effort (reservation wage) to participate in a one-time job.
- The job description requires to be in the laboratory for a given time interval to complete a certain number of the task given.
- The day the preference measurement is taken and the working takes place are separated (To prevent the effect of the sunk cost of being in the lab on the labor/leisure preferences).
- Reservation wages of the subjects to participate to the working day is elicited using Becker, DeGroot, Marschak (1964) (BDM) mechanism.

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BDM Mechanism to extract Labor/Leisure Preferences

- Becker, DeGroot, Marschak (1964) (BDM) mechanism: An incentive compatible mechanism to extract value subjects attach to their effort to participate in a one-time job.
    - The subject states the minimum wage (i.e., the reservation wage) he/she would accept to participate to the one time job.
    - The wage rate is determined randomly among a set of available wage offers.
    - If the subject's reservation wage is lower than the randomly determined wage, he/she works for the randomly selected wage rate
    - The dominant strategy for the subjects is to reveal their true reservation wages.

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Session 1: Introduction of BDM Mechanism and The Task

- The first session which is reserved for preference measurement is divided into two parts:
    - Part 1: Paid training periods for BDM mechanism (Plott and Zeiler [2005])
    - Part 2: Unpaid trial period for the real effort task

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Part 1: BDM Mechanism Training

- Endowment of tickets of 1 TL (Cason and Plott [2013])
- Choose which price offers they would accept to sell their ticket.
- Track the subjects who did not understand how the BDM mechanism works.
- Possible price offers:
  - 0 TL - 2 TL in the first 10 rounds
  - 0 TL - 3 TL in the second 10 rounds.
- Animation for random draw for effective price offer.

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Part 2: Labor/Leisure Preference Measurement

- The subjects are announced that there is a one-time job opportunity: come to the lab for the weekend and perform the task given for two hours.

- A modified version of the slider task is suggested by Gill and Prowse [2012] is used as the real effort task. Task Screenshot

- Complete as many tasks as they can in 30 minutes to understand the degree of difficulty of the task for themselves.

- Clearly instructed that the number of completed tasks in this trial part will not be used as any criteria to make payments.

- State the wages that they would accept to complete 600 units of task within 2 hours by coming to the lab in one of the specified time intervals another day.

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Part 2 Cont'd: Unexpected Bonus Announcement

- Announcement of a bonus payment of 50 TL
- Frame the bonus as a return to good conduct in the experiment to prevent any reciprocity motive that might arise towards the experimenter.
- We told that the their preferences were not yet observed and they could change their decisions if they want to. After this announcement, they were asked to resubmit their work preferences.
- This design allows us to observe the reservation wages before and after the bonus announcement.

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Summary: Course of Events
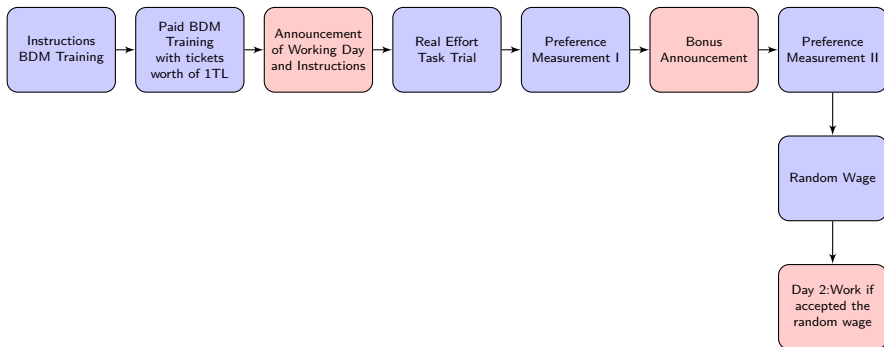
Implementation

- Sessions are run at Istanbul Bilgi University (5) and Bilkent University (2) campuses
- In the first day of the experiment, on average, 49 participants at Istanbul Bilgi University earned 78 TL whereas 56 participants at Bilkent University earned 80 TL. (Second day's earnings were approximately 50 TL in both universities.)
- Duration: Two hours per day for two days.
- Funding: The Scientific and Technological Research Council of Turkey (TUBITAK-SOBAG)

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Data Selection

- 30 subjects consistently deviated from the optimal ask of 1TL in the BDM Training part. Their data is excluded from the analysis.
  BDM Training Data

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Real Effort Task Trial Stage

Mean = 190,59
Std. Dev. = 84,396
N = 75

Number of completed tasks
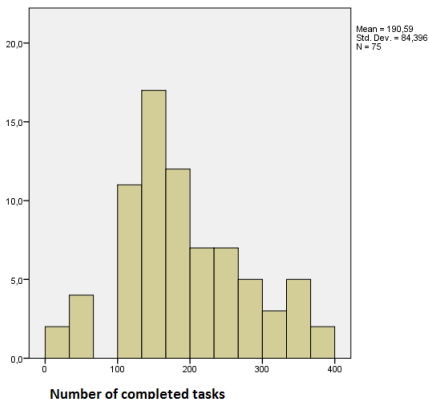
- Hypothesis: Participants who assesses the task as rather easy would complete higher number of tasks in the trial stage.

- Simple OLS regression: There is a significant negative relationship between the reservation wages and number of completed tasks in the trial stage.

- BDM mechanism is a useful tool to extract labor/leisure preferences.

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Descriptives

- We do not observe a treatment effect in the mean and median of the distribution of wages.

	N	Mean	Std. Dev.	Min	Max		Quantile	
Reservation Wage						25	50	75
Before Bonus Announcement	66	43,79	19,217	10	90	30	40	50
After Bonus Annoucement	66	43,48	20,267	10	90	30	40	50

- Within subject design of our experiment let's us to analyze the individual effects of the announcement.

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Post Experimental Survey

- Did you change the minimum wage you requested after the bonus announcement? If yes, which of the following suits your motivation?
    - I increased the minimum wage I requested as I have already earned my targeted amount today with the bonus.
    - I decreased the minimum wage I requested to deserve the bonus payment
    - I decided according to my availability in the working day.
    - None of the above
- How do your experimental earnings compare to your expected earnings before the experiment?
    - In line with my expectations
    - Above my expectations
    - Below my expectations

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Individual Effects

Change in the Reservation Wages
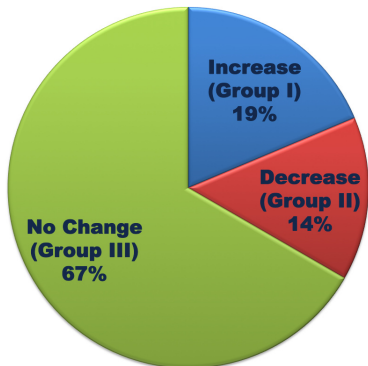
Why did you change the minimum wage you requested after the bonus announcement?

- In Group 1: 71% would work only if wages were higher as they already earned their targeted amount with the bonus payment.

- In Group 2: 46% changed their decisions to deserve the bonus payment.

Individual Effects Cont'd

Change in the Reservation Wages
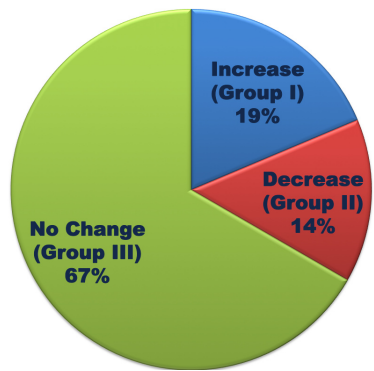
Do experimental earnings meet expectations?

	Above	Inline	Below
Group I	71%	21%	7%
Group II	27%	55%	18%
Group III	46%	50%	4%

The participants in Group 1 are more likely to assess their earnings as above average then the participants in Group 2.

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Conclusion

- The negative relationship between the reservation wages and the performance in the trial period confirms that BDM mechanism serves as a useful tool to extract labor/leisure preferences.

- Only 33% of the subjects reacts to bonus announcement. More data should be collected in order to get solid results. Size of the bonus might change the response rate.

- The presence of the subjects who increased their reservation wages: Uncontrolled factors (gift exchange, expectation of a bonus for the work day).

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Further Work

- Modify the way the bonus announcement is given:
    - The payment= todays' earning+Fixed payment
    - Fixed payment will be determined at the end with a lottery.
    - Ask the minimum wage they would accept to work for the second day for each of the fixed payment options.
    - Drawback: Two lotteries: one for fixed payment and one for wage for the second day

Thank you!

BDM Training Screenshot
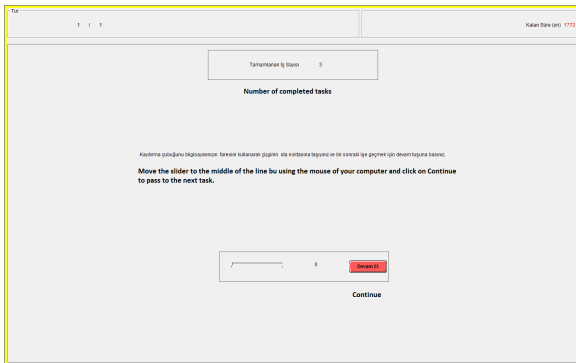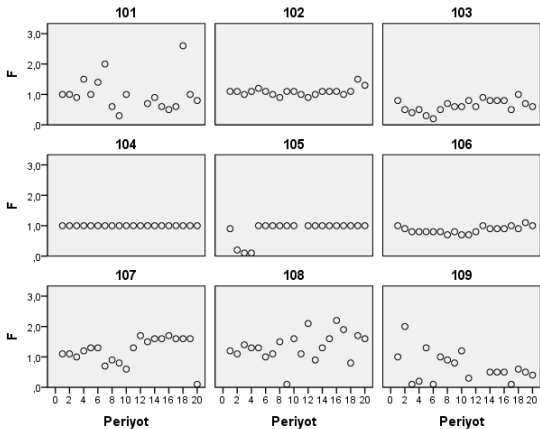

Back to BDM Training.

Task Screenshot

Back to Measurement

BDM Data

Paul Beaudry and Franck Portier. Stock prices, news, and economic fluctuations. *American Economic Review*, 96(4):1293–1307, September 2006.

Richard Blundell and Thomas Macurdy. Labor supply: A review of alternative approaches. In O. Ashenfelter and D. Card, editors, *Handbook of Labor Economics*, volume 3 of *Handbook of Labor Economics*, chapter 27, pages 1559–1695. Elsevier, 1999.

Jeffrey R. Brown, Courtney C. Coile, and Scott J. Weisbenner. The effect of inheritance receipt on retirement. NBER Working Papers 12386, National Bureau of Economic Research, Inc, July 2006.

Colin Camerer, Linda Babcock, George Loewenstein, and Richard Thaler. Labor supply of New York City cabdrivers: One day at a time. *The Quarterly Journal of Economics*, 1997.

Timothy N Cason and Charles R Plott. Misconceptions and game form recognition: Challenges to theories of revealed preference and framing. *Journal of Political Economy*, 2013.

John H. Cochrane. Shocks. *Carnegie-Rochester Conference Series on Public Policy*, 41(1):295–364, December 1994.

Jaya Dey. Evaluating monetary policy under preferences with zero wealth effect: A Bayesian approach. *Journal of Economic Dynamics and Control*, 38(C):209–234, 2014.

Henry S. Farber. Is tomorrow another day? The labor supply of New York City cabdrivers. *Journal of Political Economy*, 113(1):46–82, February 2005.

Jordi Gali, Frank Smets, and Rafael Wouters. Unemployment in an estimated New Keynesian model. In *NBER Macroeconomics Annual 2011, Volume 26*, NBER Chapters, pages 329–360. National Bureau of Economic Research, Inc, April 2011.

David Gill and Victoria Prowse. A structural analysis of disappointment aversion in a real effort competition. *American Economic Review*, 102 (1):469–503, 2012.

Jeremy Greenwood, Zvi Hercowitz, and Gregory W Huffman. Investment, capacity utilization, and the real business cycle. *American Economic Review*, 78(3):402–17, June 1988.

Douglas Holtz-Eakin, David Joulfaian, and Harvey S. Rosen. The Carnegie Conjecture: Some empirical evidence. *The Quarterly Journal of Economics*, 1993.

Guido W. Imbens, Donald B. Rubin, and Bruce I. Sacerdote. Estimating the effect of unearned income on labor earnings, savings, and consumption: Evidence from a survey of lottery players. *American Economic Review*, 91(4):778–794, 2001.

Nir Jaimovich and Sergio Rebelo. Can news about the future drive the business cycle? *American Economic Review*, 99(4):1097–1118, September 2009.

Hashmat Khan and John Tsoukalas. The quantitative importance of news shocks in estimated dsge models. *Journal of Money, Credit and Banking*, 44(8):1535–1561, 2012.

Mark R. Killingsworth and James J. Heckman. Female labor supply: A survey. In O. Ashenfelter and R. Layard, editors, *Handbook of Labor Economics*, volume 1 of *Handbook of Labor Economics*, chapter 2, pages 103–204. Elsevier, 1987.

Miles S. Kimball and Matthew D. Shapiro. Labor supply: Are the income and substitution effects both large or both small? NBER Working Papers 14208, National Bureau of Economic Research, Inc, 2008.

Robert G. King, Charles I. Plosser, and Sergio T. Rebelo. Production,

growth and business cycles: I. the basic neoclassical model. *Journal of Monetary Economics*, 21(2-3):195 – 232, 1988.

Deniz Nebioğlu. Do expectations matter? Evidence based on an estimated DSGE model. Unpublished Manuscript, 2016.

Deniz Nebioğlu and Ayça Ebru Giritligil. Labor/leisure trade-off in the laboratory. Unpublished Manuscript, 2015.

John Pencavel. Labor supply of men: A survey. In Ashenfelter O. and Layard R., editors, *Handbook of Labor Economics*, volume 1, chapter 01, pages 3–102. Elsevier, 1 edition, 1987.

Arthur C. Pigou. *Industrial fluctuations*. Macmillan and Company, limited, 1927.

Charles R. Plott and Kathryn Zeiler. The willingness to pay-willingness to accept gap, the "endowment effect," subject misconceptions, and experimental procedures for eliciting valuations. *American Economic Review*, 95(3):530–545, 2005.

Stephanie Schmitt-Grohé and Martin Uribe. What's news in business cycles. *Econometrica*, 80(6):2733–2764, 2012.

Frank Smets and Rafael Wouters. Shocks and frictions in US business cycles: A bayesian DSGE approach. *American Economic Review*, 97 (3):586–606, June 2007.

Thomas van Huizen. More wealth, shorter hours? Evidence from the Netherlands. *Economics Letters*, 125(2):323–326, 2014.