

Efficiency in Household Decision Making: Evidence from the Retirement Savings of US Couples

Taha Choukhmane

MIT Sloan

Lucas Goodman

U.S. Treasury

Cormac O'Dea

Yale University

July 2022

Disclaimer

The research reported herein was performed pursuant to a grant from the U.S. Social Security Administration (SSA) funded as part of the Retirement and Disability Consortium. The opinions and conclusions expressed are solely those of the author(s) and do not represent the opinions or policy of SSA or any agency of the Federal Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of the contents of this report. Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply endorsement, recommendation or favoring by the United States Government or any agency thereof.

The views expressed in this presentation are those of the authors and do not necessarily reflect the views of the U.S. Department of the Treasury.

Outline

1 Introduction

2 Framework

3 Data

4 Results

5 Mechanism

How do couples make financial decisions?

Two views of the couple:

Independent Decisions

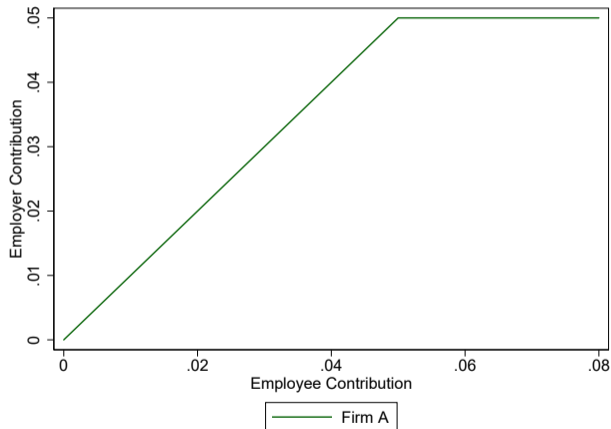
- Empirical work often relies on individual-level data
- Frequent implicit assumption: individual response to a policy does not affect their spouse's behavior

Efficient Coordination

- Most theoretical models assume efficient coordination:
 - ▶ Unitary model (a single utility function)
 - ▶ Collective models (e.g. efficient household bargaining)
- Individual-level data can be misleading about household-level behavior

A New Test of Household Efficiency

Q: Do married couples efficiently save for retirement?



A New Test of Household Efficiency

Q: Do married couples efficiently save for retirement?

Example:

- Spouse 1 works at Firm A where retirement contributions are **matched dollar-for-dollar up to 5%** of salary ($r_1 = 100\%$)
- Spouse 2 works at Firm B where contributions are **matched 50c on the dollar up to 6%** of salary ($r_2 = 50\%$)

Efficient Outcome:

- Spouse 2 should not contribute unless Spouse 1 has fully exploited their match
- Neither spouse should contribute beyond their match cap while the other has some unexploited match.

Example: Each Spouse wants to Contribute \$600

Spouse 1's account

Match dollar-for-dollar up to \$1000

Spouse 2's account

Match 50cts on the dollar up to \$1000

An uncoordinated outcome

	<u>Spouse 1</u>	<u>Spouse 2</u>	
Contribution	\$600	\$600	
Employer match	\$600	\$300	= \$900

Invest \$1,200 => get \$900 in match

Cooperative outcome

(i.e. unique efficient allocation)

	<u>Spouse 1</u>	<u>Spouse 2</u>	
Contribution	\$1,000	\$200	
Employer match	\$1,000	\$100	= \$1,100

Invest \$1,200 => get \$1,100 in match

Arbitrage opportunity: \$200 left on the table!

Are the outcomes of household decision-making efficient?

Vast literature fails to reject efficiency of household **consumption** choices...

Using survey data of consumption from: the United States ([Chiappori et al, '02](#)), the United Kingdom ([Blundell et al, '07](#); [Dauphin et al, '11](#)), Canada ([Browning and Chiappori, '98](#)), Russia ([Cherchye et al, '09](#)), France ([Bourguignon et al, '93](#)), Mexico ([Bobonis, '09](#); [Attanasio and Lechene, '14](#)), Indonesia ([LaFave and Thomas, '17](#)), Burkina Fasso ([Rangel and Thomas, '20](#)).

Are the outcomes of household decision-making efficient?

Vast literature fails to reject efficiency of household **consumption** choices...

BUT mixed results for **productive** efficiency tests in developing countries

- **Udry '96**: households farm more intensively plots controlled by husbands. Rejection of Pareto Efficiency? Alternatively:
 - ▶ women have less secure tenure rights ([Goldstein, Udry, '08](#))
 - ▶ differences in productivity could reflect measurement error ([Thomas, Rangel, '20](#))
- Evidence of inefficiency in household choices in field experiments ([Ashraf'09](#), [Schaner'15](#), [Conlon et al.'21](#)). Do these results extend to:
 - ▶ Naturally-occurring decisions with repeated interactions
 - ▶ Developed countries with different institutions, norms, culture

Why Test Efficiency in Retirement Saving?

Foundational assumption in almost all models of the household:

- Savings decisions, education decisions, fertility, investment in children, divorce

Advantage of this setting:

- Match incentives are large and transparent
- Efficient policy can be clearly defined & measurable to us

Favorable conditions for cooperation to emerge:

- Division in divorce is not affected by who made the contribution
- Repeated decisions (can learn/build familiarity with the setting)
- Partially illiquid asset (facilitate commitment)
- Often spousal consent required for major plan actions

In absence of efficiency in this setting, in what (financial) decisions should we observe it?

What we do?

1. Construct new employee-employer merged dataset

- Collect detailed data on retirement plan features for >5,000 plans with >44m workers
 - ▶ Matching schedules, vesting schedules, auto-features and more
- Merge with tax records to observe savings decisions
 - ▶ Can see contributions to employer sponsored accounts

2. Result: evidence of coordination but non-coordination is widespread

- 25% of couples leave an average approx \$700 per year on the table
- Compared to \approx 40% inefficient couple in no-coordination benchmark

3. Interpretation: inefficiency arises b/c ...

- ... individuals are inefficient? limited evidence due to inertia, heuristics, AE
- ... individuals are individually efficient but collectively inefficient? We find evidence of this

Outline

1 Introduction

2 Framework

3 Data

4 Results

5 Mechanism

Unitary and Collective Models of the Household

- Unitary model of the household assumed that household preferences can be expressed with a single utility function
 - ▶ \Rightarrow distribution of resources within household **DOES NOT** matter for household decisions.
- Unitary model is often rejected for many uses ([Chiappori and Mazzocco '17 review](#))
 - ▶ i.e. the dist of resources inside the household often **DOES** matter for household decisions.
- No one alternative model but most adopt the **collective setting** which admits distinct decision-makers with different preferences
([Chiappori '88](#), [Browning and Chiappori '98](#))
 - ▶ Assumes that household decisions in each period are Pareto-efficient
 - ▶ No assumption about how they reach/pick efficient outcome
 - ▶ In dynamic contexts, commitment to future actions is typically limited but the 'ex-post' efficiency we test is maintained ([Mazzocco 2007](#))

Fundamental Assumption in the Collective Model

From the abstract of Browning and Chiappori (1998):

We make minimal assumptions about how the individual members of the household resolve conflicts. **All we assume is that, however decisions are made, outcomes are efficient.** We refer to this as the collective setting.

A Simple Collective Model

- Solution to this problem needs to be on the Pareto Frontier
- With first-period saving $S \equiv s^A + s^B$, the allocation of saving between spouses must satisfy:

$$\{s^{*A}, s^{*B}\} \in \arg \max r^A(s^A) + r^B(s^B) \quad \text{s.t.} \quad s^A + s^B \leq S$$

- Define foregone match:

$$FM = (r(s^{*A}) + r(s^{*B})) - (r(s^A) + r(s^B))$$

- ▶ FM : extra match that could have been (costlessly) achieved by reallocating contributions
 - ▶ Dual condition: consumption today could have been higher at no cost to retirement wealth
- $FM = 0$ is a **testable implication** of productive efficiency given variation, within household, in saving technology $r^A(\cdot), r^B(\cdot)$

Divorce

- US states' divorce law does not favor the individual who put the money into the retirement account
 - ⇒ even if divorce is a certainty, the incentive exists to exploit most generous match
- Some states have very simple rules, we will use this as a test of whether divorce law knowledge is relevant
- Even if divorce law did favor the spouse whose name is on the account, the long term nature of the 'contract' might facilitate cooperation

Outline

1 Introduction

2 Framework

3 Data

4 Results

5 Mechanism

Form 5500 has *narrative* descriptions of:

- Eligibility
- Matching schedule
- Vesting schedule
- Auto-features

Contributions - Each year, participants may contribute from 1% to 50% of their pre-tax annual compensation, as defined by the Plan, subject to the Internal Revenue Code limitations. Eligible employees are automatically enrolled as participants at a contribution rate of 1% of their pre-tax annual compensation unless they elect otherwise. Participants age 50 and older, or who reach age 50 during the Plan year, are eligible to contribute an additional pre-tax dollar amount per year in addition to the deferral contribution. For 2011, the maximum annual amount of catch up that could be contributed was \$5,500. The Company makes contributions to the Plan each payroll period, based upon a matching formula applied to employee deferrals (the Company Match). The Company Match formula is as follows: the first 3% of contributions are matched by the Plan Sponsor at the rate of 100%; the next 2% of contributions are matched at the rate of 50%; and the next 1% of contributions are matched at the rate of 25%. Participants are eligible to receive the Company Match pursuant to the terms of the Plan. Participants may also contribute amounts representing eligible rollover distributions from other qualified plans.

Participant Accounts - Individual accounts are maintained for each Plan participant. Each participant's account is credited with the participant's contribution, the Company Match, and an allocation of Plan earnings, and charged with benefit payments and allocations of Plan losses and investment expenses. Allocations are based on participant earnings or account balances. The benefit to which a participant is entitled to is the benefit that can be provided from the participant's vested account balance.

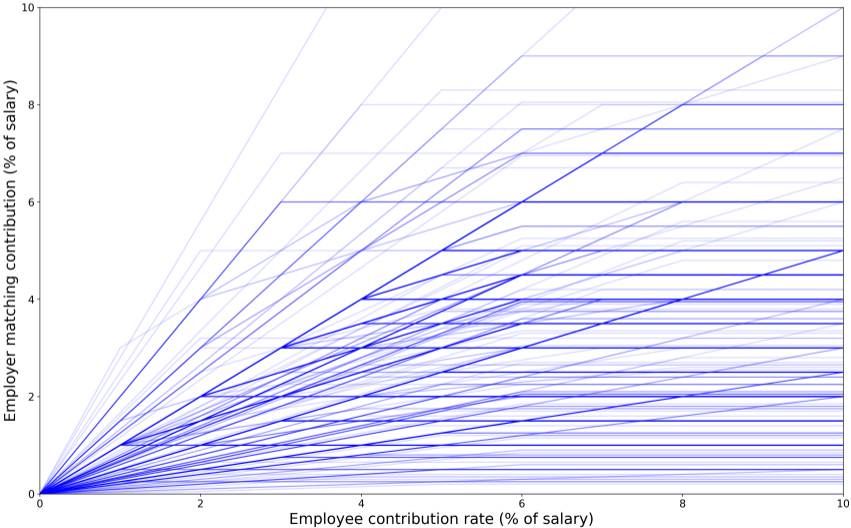
Vesting - All participants are 100% vested in the Plan at all times.

Data: what we do

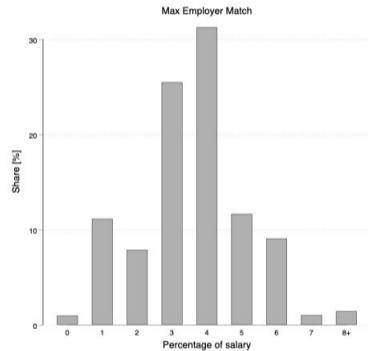
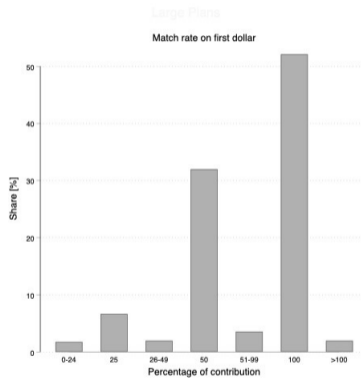
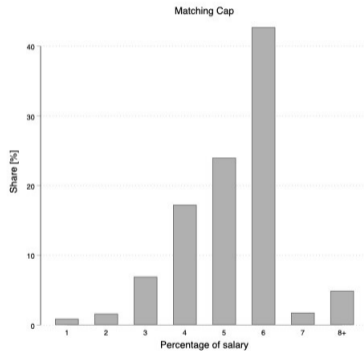
- We codify this data for:
 - ▶ The largest 5,000 DC plans
 - ▶ A random sample (approx 1,000) of smaller plans
- Years 2003-2018
- And link (using EIN) to W2s
 - ▶ We use information from Form 8955-SSA to convert 5500 EIN to W-2 EIN.

This gives us a merged employee-employer data set with **44 million eligible workers**

Wide variation in match incentives



Heterogeneity in Match Schedule



Merging into Tax Records: Our Sample

Population we study ($\approx 1/3$ of joint filers). Couples:

- 1 File a tax return
 - 2 Both spouse are employed
 - 3 Both spouses have access to DC plan, plus one contributes
- Further restriction: need to be in our merged sample
 - ▶ Approx 550,000 couples in merged employee-employer dataset

	Income		Age	Marriage length	Population size
	Mean	Median			
Panel A: Population	\$139,966	\$105,701	45.1	11.9	18,218,500
Panel B: Matched Sample	\$142,691	\$116,453	42.8	10.3	540,800

Notes: For disclosure avoidance, all quantiles in these slides are quasi-quantiles, equal to the mean of the 20 observations nearest the true quantile.

Outline

1 Introduction

2 Framework

3 Data

4 Results

5 Mechanism

The incidence of non-coordination

- $FM = 0$ is a **testable implication** of efficiency

Table: Proportion with FM

	(1) N	(2) Prop.
All	540,800	25.1%
(1) No unvested	351,700	23.6%
(2) Age restriction	452,300	25.3%
(3) No short tenure	390,000	24.3%
Baseline: (1), (2), and (3)	268,900	23.9%
(4) Baseline + no low earnings	222,900	24.1%
(5) Baseline + no Equitable Division	68,700	24.6%
(6) Baseline + no Auto-Enrollment	200,300	23.5%
(7) Baseline + no age ≥ 55	233,100	24.2%
(8) All Restrictions (4)-(7)	37,000	24.9%

How costly is non-coordination?

Table: Distribution of *FM* (foregone match) (per year, for those not coordinating)

	(1)	(2)
Stat	Dollars	Prop of Employee Cont.
Mean	\$682	13%
p10	\$55	1%
p25	\$141	3%
p50	\$350	9%
p75	\$827	18%
p90	\$1741	31%

Notes: For disclosure avoidance, all quantiles in these slides are quasi-quantiles, equal to the mean of the 20 observations nearest the true quantile.

Two Statistical Benchmarks

75% of couples with no foregone match are not necessarily coordinating:

- unilateral decisions happen to be aligned with efficient allocation
- Example: both spouses are fully exploiting their match

=> need a benchmark for foregone match under no-coordination

Re-arranging married couples

- Find a 'fake' spouse with similar age and earnings as real spouse

Marrying up singles

- For each spouse find a single with same firm, gender, age and similar earnings and contributions

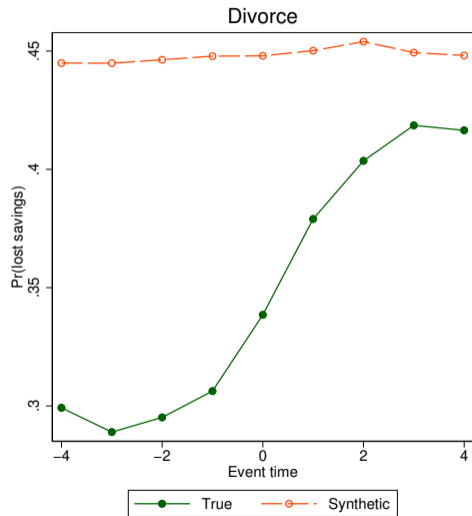
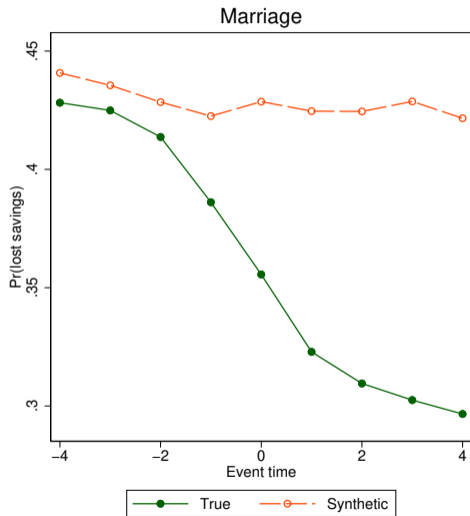
Two Statistical Benchmarks

- Comparing non-coordination in true vs. synthetic couples:

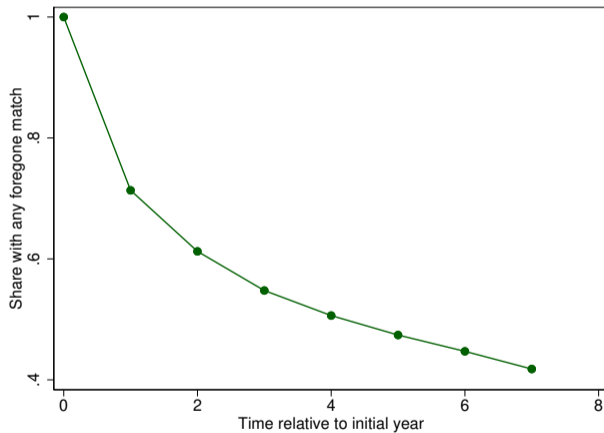
	True Sample	Re-arranging married couples	Marrying up singles
Proportion with $FM > 0$	23.9%	37.7%	35.2%

- Estimates suggest that a substantial fraction of couples are collectively inefficient

Fact 1: Marriage matters for coordination



Fact II: Non-coordination is persistent



Fact III: correlates of over-contribution

- Opposite result to Udry (96): under-investment in husband's accounts

Table: The Role of Gender and Earnings Shares

	Prop. Men among under-savers
Husband Earns > 50% More	0.390
Husband Earns 20% – 50% More	0.519
≈ Equal Earnings	0.557
Wife Earns 20% – 50% More	0.613
Wife Earns > 50% More	0.759

- Preference heterogeneity?
 - ▶ Wives of men age 65 have 50% longer survival horizon in Canada (Browning '00)

Outline

1 Introduction

2 Framework

3 Data

4 Results

5 Mechanism

What explains this?

Spouses are individually inefficient (e.g. behavioral biases)

VS

Spouses are individually efficient but collectively inefficient

Are spouses individually inefficient?

- Not explained by inertia [More](#)
 - ▶ Conditional on making an **active** contribution change, couples do not become better coordinated
- Not explained by equal-saving heuristics (Gathergood, et al 19) [More](#)
 - ▶ Those who equalize are *more* likely to coordinate
- Non-coordination similar with and without autoenrolment [More](#)
- Financial literacy/Information channels: perhaps? But:
 - ▶ Sample are high income (median hh inc. \approx \$110k), working in large firms
 - ▶ Even for couples working in the same firm (same information), non-coordination remains substantial (22%)

Are spouses individually efficient but collectively inefficient?

- Conditional on contributions and income, probability of having foregone match: [More](#)
 - ▶ ↘ with length of marriage
 - ▶ ↘ with having kids
 - ▶ ↘ with having a mortgage
 - ▶ ↗ with subsequent divorce
 - ▶ ↘ with having a joint account pre marriage

Conclusion

- A significant share of couples are failing to coordinate efficiently
 - ▶ Average cost of non-coordination is large (\approx \$700 per year)
- Correlates of inefficient outcomes suggest lack of commitment is the relevant mechanism
- Broader take-aways:
 - 1 Policy evaluation/inference from individual-level data may not be as misleading as implied by most household models
 - 2 Larger role for models that don't achieve efficiency?:
Inefficient bargaining, [Basu, \(2006\)](#); endogenous participation [Del Boca & Flinn \(2012\)](#);
'seperate spheres' in decision-making, not simply threat point, [Lundberg & Pollak, \(1993\)](#)

Table: Proportion with $FM > 0$ for those couples as a function of number of contributors

	True Sample	Synthetic Sample M	Synthetic Sample S
Full sample	23.9%	37.7%	35.2%
One contributes	46.9%	57.2%	53.5%
Both contribute	14.9%	26.5%	27.9%

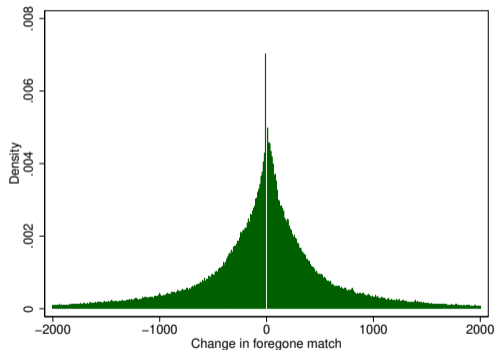
Table: Characterizing Nature of Noncoordination

	Both spouses contribute	One spouse contributes
Neither above cap	21.0%	20.4 %
One member above cap	34.8%	23.9%

The role of inertia & adjustment frictions

Back

- Conditional on making an **active** contribution change, couples do not become better coordinated

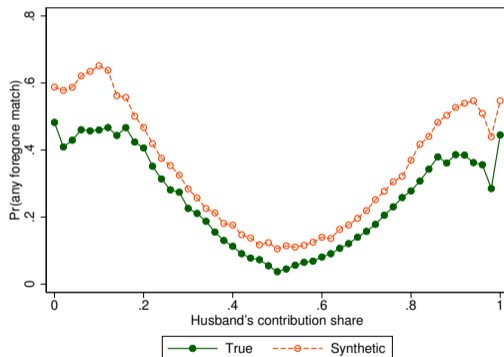


- The mean of this distribution is -\$5! With 16.8% increasing the size of foregone match and 17.1% decreasing it.

Equal Saving Heuristics

Back

- Probability of having foregone match as a proportion of husband's contribution share



- Couples who equalize are *less* likely to have foregone match

Autoenrollment

Back

	Prop. with $FM > 0$	
Both before	Omitted (-)	Omitted (-)
One before, one after	0.0200 (0.0022)	0.0136 (0.0024)
Both after	-0.0547 (0.0028)	-0.0230 (0.054)
Baseline mean	0.237	0.237
Inc. x Contrs. Controls	X	X
Full Controls		X
Observations	268,800	268,800

Proxies for commitment

Back

	Prop. with $FM > 0$	Prop. with $FM > 0.$
Length of marriage	-0.0019 (0.0001)	-0.0066 (0.0008)
Kids	-0.0204 (0.0014)	-0.0253 (0.0034)
Mortgage	-0.0368 (0.0020)	-0.0372 (0.0040)
Future Divorce	0.0282 (0.0026)	0.0213 (0.0042)
Joint Bank Account		-0.0475 (0.0055)
Baseline mean	0.239	0.266
Inc. x Conts. Controls	X	X
Full Controls	X	X
Observations	268,800	68,600

Proportion not coordinating

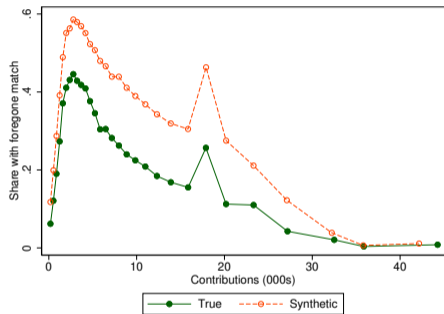


Figure: Comparison with Married Placebo

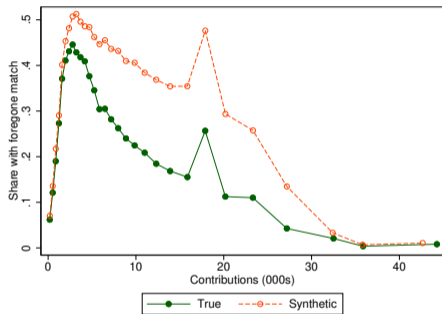


Figure: Comparison with Single Placebo