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  • respectful of other fields and approaches

• fearless and open minded, driven by true passion for economics
  (late father was an economist)
Productivity and Misallocation in General Equilibrium

David Rezza Baqae
UCLA

Emmanuel Farhi
Harvard

March 10, 2020

Abstract

This paper develops a general theory of aggregation in inefficient economies. We provide non-parametric formulas for aggregating microeconomic shocks in economies with distortions such as taxes, markups, frictions to resource reallocation, financial frictions, and nominal rigidities. We allow for arbitrary elasticities of substitution, returns to scale, factor mobility, and input-output network linkages. We show how to separately measure changes in technical and allocative efficiency. We also show how to compute the social cost of distortions. We pursue applications focusing on firm-level markups in the U.S. We find that improvement in allocative efficiency, due to the reallocation over time of market share to high-markup firms, accounts for about half of aggregate TFP growth over the period 1997-2015. We also find that eliminating the misallocation resulting from the large and dispersed markups estimated in the data would raise aggregate TFP by about 15%, increasing the economy-wide cost of monopoly distortions by two orders of magnitude compared to the famous 0.1% estimate by Harberger (1954). These exact numbers should be interpreted with care since the data is imperfect and requires substantial imputation.

*Emails: baqae@econ.ucla.edu, efarhi@harvard.edu. We thank Philippe Aghion, Pol Antras, Andrew Atkeson, Susanto Basu, John Geanakoplos, Ben Golub, Gita Gopinath, Dale Jorgensen, Marc Melitz, Ben Moll, Matthew Shapiro, Dan Trefler, Venky Venkateswaran and Jaume Ventura for their valuable comments. We are especially grateful to Natalie Bau for detailed conversations. We thank German Gutierrez, Thomas Philippon, Jan De Loecker, and Jan Eeckhout for sharing their data. We thank Thomas Brzustowski and Maria Voronina for excellent research assistance.
A MODEL OF THE INTERNATIONAL MONETARY SYSTEM

EMMANUEL FARHI AND MATTEO MAGGIOI

We propose a simple model of the international monetary system. We study the world supply and demand for reserve assets denominated in different currencies under a variety of scenarios: a hegemon versus a multipolar world; abundant versus scarce reserve assets; and a gold exchange standard versus a floating rate system. We rationalize the Triffin dilemma, which posits the fundamental instability of the system, as well as the common prediction regarding the natural and beneficial emergence of a multipolar world, the Nurks warning that a multipolar world is more unstable than a hegemon world, and the Keynesian argument that a scarcity of reserve assets under a gold standard or at the zero lower bound is recessionary. Our analysis is both positive and normative. JEL Codes: D42, E12, E42, E44, F3, F55, G15, G28.

I. INTRODUCTION

We propose a formal model of the International Monetary System (IMS). We consider the IMS as the collection of three key attributes: (i) the supply of and demand for reserve assets; (ii) the exchange rate regime; and (iii) international monetary institutions. We show how modern theories developed to analyze sovereign debt crises, oligopolistic competition, and Keynesian...
COORDINATION AND CRISIS IN MONETARY UNIONS*

MARK AGUIAR
MANUEL AMADOR
EMMANUEL FARHI
GITA GOPINATH

We study fiscal and monetary policy in a monetary union with the potential for rollover crises in sovereign debt markets. Member-country fiscal authorities lack commitment to repay their debt and choose fiscal policy independently. A common monetary authority chooses inflation for the union, also without commitment. We first describe the existence of a fiscal externality that arises in the presence of limited commitment and leads countries to overborrow; this externality rationalizes the imposition of debt ceilings in a monetary union. We then investigate the impact of the composition of debt in a monetary union, that is the fraction of high-debt versus low-debt members, on the occurrence of self-fulfilling debt crises. We demonstrate that a high-debt country may be less vulnerable to crises and have higher welfare when it belongs to a union with an intermediate mix of high- and low-debt members, than one where all other members are low-debt. This contrasts with the conventional wisdom that all countries should prefer a union with low-debt members, as such a union can credibly deliver low inflation. These findings shed new light on the criteria for an optimal currency area in the presence of rollover crises. JEL Codes: E4, E5, F3, F4.

I. INTRODUCTION

Monetary unions are characterized by centralized monetary policy and decentralized fiscal policy. The problems associated with stabilizing the impact on welfare of asymmetric shocks across countries with a common monetary policy have been studied in depth starting with the seminal work of Mundell (1961) on optimal currency areas. The ongoing euro crisis has, however, brought to the forefront a novel set of issues regarding welfare of countries in a monetary union with asymmetric debt levels that are subject to rollover risk in sovereign debt markets. To study these issues we provide a framework that describes the impact of centralized monetary policy and decentralized fiscal policy on...
Unconventional Fiscal Policy at the Zero Bound†

By Isabel Correia, Emmanuel Farhi, Juan Pablo Nicolini, and Pedro Teles*

When the zero lower bound on nominal interest rates binds, monetary policy cannot provide appropriate stimulus. We show that, in the standard New Keynesian model, tax policy can deliver such stimulus at no cost and in a time-consistent manner. There is no need to use inefficient policies such as wasteful public spending or future commitments to low interest rates. (JFI, E12, F43, F52, F62, H20)

Arbitrage between money and bonds requires nominal interest to be positive. This “zero bound” constraint gives rise to a macroeconomic situation known as a liquidity trap. It presents a difficult challenge for stabilization policy.

There is a well-developed Keynesian view on the subject. In a liquidity trap, monetary policy is ineffective—increasing the money supply is like “pushing on a string.” The standard Keynesian prescription is to use fiscal policy in order to stimulate the economy, in the form of tax cuts or government spending increases. Expansionary fiscal policy is presumed to be especially effective in a liquidity trap due to the lack of eviction effects through higher interest rates. This recommendation has been very influential in shaping policy. Yet its validity can be questioned and refined. Indeed, the absence of microfoundations, lack of dynamics, and neglect of expectations formation in the basic IS-LM model creates difficulties for normative analysis (how to think about welfare), as well as for positive analysis (how to think about the adjustment of prices, about the effects of different taxes versus government expenditures, or about the effects of future policy commitments).

Recently, a literature has emerged that revisits the Keynesian analysis in the context of explicitly microfounded, dynamic, rational expectations models with nominal rigidities that do not suffer from these shortcomings. There is now an emerging New Keynesian view of liquidity traps. Krugman (1998) and Eggertsson and Woodford (2003), and more recently Werning (2012) have characterized optimal
Saving and investing for early retirement: 
A theoretical analysis

Emmanuel Farhi\textsuperscript{a}, Stavros Panageas\textsuperscript{b,*}

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Available online 5 September 2006

Abstract

We study optimal consumption and portfolio choice in a framework where investors adjust their labor supply through an irreversible choice of their retirement time. We show that investing for early retirement tends to increase savings and reduce an agent's effective relative risk aversion, thus increasing her stock market exposure. Contrary to common intuition, an investor might find it optimal to increase the proportion of financial wealth held in stocks as she ages and accumulates assets, even when her income and the investment opportunity set are constant. The model predicts a decrease in risk aversion following strong market gains like those observed in the nineties.

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\textit{JEL classification:} E21; G11; G12; J23

\textit{Keywords:} Continuous time; Optimal stopping; Retirement; Portfolio choice; Savings; Marginal propensity to consume; Indivisible labor

New Keynesian view of liquidity traps. Krugman (1998) and Eggertsson and Woodford (2003), and more recently Werning (2012) have characterized optimal
Fiscal Devaluations

EMMANUEL FARHI
Harvard University

GITA GOPINATH
Harvard University

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OLEG ITSKHOKI
Princeton University

First version received June 2012; final version accepted August 2013 (Eds.)

We show that even when the exchange rate cannot be devalued, a small set of conventional fiscal instruments can robustly replicate the real allocations attained under a nominal exchange rate devaluation in a dynamic New Keynesian open economy environment. We perform the analysis under alternative pricing assumptions—producer or local currency pricing, along with nominal wage stickiness; under arbitrary degrees of asset market completeness and for general stochastic sequences of devaluations. There are two types of fiscal policies equivalent to an exchange rate devaluation—one, a uniform increase in import tariff and export subsidy, and two, a value-added tax increase and a uniform payroll tax reduction. When the devaluations are anticipated, these policies need to be supplemented with a consumption tax reduction and an income tax increase. These policies are revenue neutral. In certain cases equivalence requires, in addition, a partial default on foreign bond holders. We discuss the issues of implementation of these policies, in particular, under the circumstances of a currency union.

Key words: Devaluation, Fiscal, VAT, Payroll Tax

JEL Codes: E32, E60, F30

1. INTRODUCTION

Exchange rate devaluations have long been proposed as a desirable policy response to macroeconomic shocks that impair a country’s competitiveness in the presence of price and wage rigidities. Milton Friedman famously argued for flexible exchange rates on these grounds. Yet countries that wish to or have to maintain a fixed exchange rate cannot resort to exchange rate devaluations. In this article, we show how a country can use unilateral fiscal policy to generate the same real outcomes as those following a nominal exchange rate devaluation, while keeping
Optimal Taxation with Behavioral Agents

By Emmanuel Farhi and Xavier Gabaix*

This paper develops a theory of optimal taxation with behavioral agents. We use a general framework that encompasses a wide range of biases such as misperceptions and internalities. We revisit the three pillars of optimal taxation: Ramsey (linear commodity taxation to raise revenues and redistribute), Pigou (linear commodity taxation to correct externalities) and Mirrlees (nonlinear income taxation). We show how the canonical optimal tax formulas are modified and lead to novel economic insights. We also show how to incorporate nudges in the optimal taxation framework, and jointly characterize optimal taxes and nudges.

JEL: D03, H21

This paper develops a systematic theory of optimal taxation with behavioral agents. Our framework allows for a wide range of behavioral biases (for example, misperception of taxes or internalities), structures of demand, externalities, and population heterogeneity, as well as tax instruments. We derive a behavioral version of the three pillars of optimal taxation: Ramsey (1927) (linear commodity taxation to raise revenues and redistribute), Pigou (1920) (linear commodity taxation to correct for externalities), and Mirrlees (1971) (nonlinear income tax.
Crash Risk in Currency Markets

Emmanuel Farhi
Harvard University and NBER

Samuel P. Fraiberger
NYU

Xavier Gabaix
NYU Stern and NBER

Romain Ranciere
IMF, PSE and CEPR

Adrien Verdelhan
MIT Sloan and NBER

March 12, 2015

Abstract

Since the Fall of 2008, out-of-the-money puts on high interest rate currencies have become significantly more expensive than out-of-the-money calls, suggesting a large crash risk of those currencies. To evaluate crash risk precisely, we propose a parsimonious structural model that includes both Gaussian and disaster risks and can be estimated even in samples that do not contain disasters. Estimating the model for the 1996 to 2014 sample period using monthly exchange rate spot, forward, and option data, we obtain a real-time index of the compensation for global disaster risk exposure. We find that disaster risk accounts for more than a third of the carry trade risk premium in advanced countries over the period examined. The measure of
OUR WORK TOGETHER

- Topics...
  - **Optimal Taxation**
    Long run inequality, wealth and estate taxation, political economy, taxation and insurance over life cycle...
  - **Macro Stabilization**
    Macropudential Policy, Fiscal Unions, Capital Controls, Fiscal Multipliers ...
  - **Behavioral Macro**
    non-rational expectations, level-k, extrapolative
  - Methodologically connected...
    - normative focus with simple models
  - Public Finance ↔ Macro
  - goal: qualitative insights and quantitative explorations
Working with Emmanuel Farhi can make my head hurt and want to scream.
LONG-RUN INEQUALITY

- What is optimal long-run distribution and social mobility in society?

- Surprising result (Atkeson-Lucas, 1993)
  - Barro altruistic dynasties
  - each period shock to productivity
  - private information
  - look for optimal dynamic insurance mechanism

- Result:
  - consumption a (geometric) random walk
  - inequality grows without bound
  - no long run distribution exists
LONG-RUN INEQUALITY

- Farhi-Werning “Inequality and social discounting” (JPE)

- explored extra Pareto weight on future generations... lower discounting

- Whenever planner was more patient...
  - consumption has mean reversion...
  - ...long-run distribution exists with bounded inequality

- Implications for wealth/bequest taxation?
BEQUEST TAXATION

• Farhi-Werning “Progressive Estate Taxation”
  ▸ Results...
    ▸ **progressive** = creates more equality for kids
    ▸ **subsidy** = negative tax...
      ▸ plausible at bottom!
    ▸ sign may overturned (Farhi-Werning 2013)
BEQUEST TAXATION

• Farhi-Werning “Progressive Estate Taxation”
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• What if future gets weight because they will vote? Farhi-Werning, Farhi-Sleet-Werning-Yeltekin

• **Limited commitment:**
  not taxing future wealth may not be credible if inequality grows
discontent may lead to drastic reforms

• Q: What policies ex ante?
POLITICAL ECONOMY

- Two periods, no direct extra weight on future

- Political Economy: credibility constraint; ex post: reform unless...

\[ \int u(c_1) \geq u \left( (1 - \kappa) \int c_1 \right) \]

Bound on Inequality
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Bound on Inequality

▸ Again: progressive tax on saving

▸ New: wealth at the top has negative value, hurts credibility constraint: positive tax
POLITICAL ECONOMY

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\]

Bound on Inequality

- Again: progressive tax on saving

- New: wealth at the top has negative value, hurts credibility constraint: **positive tax**

- Extension: remove exogenous $\kappa$, add dynamic game, reputational concerns (Abreu-Pearce-Stachetti)
OTHER WITH OPTIMAL TAX PERSPECTIVE

• Job Market Paper: Capital Taxation and Ownership when Markets are Incomplete

• Gabaix-Farhi: Optimal Taxation with Behavioral Agents

• Farhi-Gopinath-Iztkhoki: Fiscal Devaluations

• Correia-Farhi-Nicolini-Teles: Unconventional Fiscal Policy at the Zero Lower Bound
OUR WORK TOGETHER

• Topics...

• Optimal Taxation
  Long run inequality, wealth and estate taxation, political economy...

• Macro Stabilization
  Macroprudential Policy, Fiscal Unions, Capital Controls, Fiscal Multipliers ...

• Behavioral Macro
  non-rational expectations, level-k, extrapolative
MACROECONOMIC STABILITY

- Open Economy, motivated by European Crisis
  - Capital Controls
  - Fiscal Unions
  - Labor Mobility

OCA: Mundell, McKinnon, Kennan

- Macroprudential Policy
- Fiscal Policy
**FISCAL UNIONS**

- **Our approach:** set up the planning problem for optimal transfers given currency union

- Social Marginal Utility ≠ Private Marginal Utility

- Aggregate Demand Externality

- Key equation...

\[
\frac{U_i^i}{CT_i(s)} \frac{1 + \frac{\alpha_i(s)}{p_i(s)} \tau_i(s)}{U_i^i(s)} = \frac{U_i^{i'}}{CT_i(s')} \frac{1 + \frac{\alpha_i(s')}{p_i(s')} \tau_i(s')}{U_i^{i'}(s')}
\]

- Insurance equals Social Marginal Utility which internalizes aggregate demand externality

- Result #1: private insurance not optimal; intervention needed

- Result #2: insurance not just different, but more valuable socially than privately
MACROPRUDENTIAL

- Financial decisions
  - e.g. credit boom
  - high leverage and risk taking

- Macro impact
  - e.g. low return shock
  - lower future loans
MACROPRUDENTIAL

Macropru regulation

Financial decisions

- E.g. credit boom
- High leverage and risk taking

Macro impact

- E.g. low return shock
- Lower future loans
MACROPRUDENTIAL

Is there a market failure?
Not necessarily.
Externality needed.

- e.g. credit boom
  high leverage and risk taking

- e.g. low return shock
  lower future loans

- macro impact

- financial decisions

- macropru regulation
MACROPRUDENTIAL

macropru regulation

financial decisions

e.g. credit boom
  high leverage and risk taking

monetary policy?

macro impact

e.g. low return shock
  lower future loans

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monetary policy?

macropru regulation

monetary policy?

financial decisions

macro impact

e.g. credit boom
high leverage and risk taking

e.g. low return shock
lower future loans

Is there a market failure?
Not necessarily.
Externality needed.
MACROPRUDENTIAL POLICY

• Main result...
  • connect distortions in spot markets
  • other sufficient statistic: MPCs
  • to necessary interventions (shadow taxes) in financial markets
• Key equation...

\[
\frac{\tau^i_{D,s}}{1 + \tau^i_{D,s}} = \sum_{j \in J_s} P_{j,s} X^i_{I,j,s} \tau_{j,s}
\]

shadow finance tax = sum of MPCs times wedges in spot markets
In a series of papers, explore departures from rational expectations

Combined with financial market imperfections...

Positive:
“Monetary Policy, Bounded Rationality and Incomplete Markets”

“The Fiscal Multiplier Puzzle: Liquidity Traps, Bounded Rationality, and Incomplete Markets” (with Petri)

Incomplete Markets and Behavioral are Complements Help Resolve Forward Guidance Puzzle

Normative “Taming a Minsky Cycle”

Extrapolative Expectations: departures from Inflation Targeting through effects on Asset Prices
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• Broad work on crucial topics of our time
• Testament that much to be explored in macroeconomics
• Theory needed: explore new ideas, drawing out implications of old
• Inspirational for future generations
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