Putting More Micro in Macro and Using It for Policy Analysis

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“Philosophical” Motivation

“I would like to know how the macroeconomic model that I more or less believe can be reconciled with the trade models that I also more or less believe. [...] What we need to know is how to evaluate the microeconomics of international monetary systems. Until we can do that, we are making policy advice by the seat of our pants.”

Paul R. Krugman (1995), “What Do We Need to Know about the International Monetary System?” in Peter B. Kenen, ed., *Understanding Interdependence*, Princeton U Press.

“Philosophical” Motivation, Continued

- Modern international macroeconomics prides itself with being microfounded.
- Yet, until recently, it neglected to analyze how macro phenomena can affect the microeconomic underpinnings of the macro structure.
- Similarly, much of trade theory fails to recognize that micro dynamics have aggregate effects that can feed back into further micro adjustments over time.

“Philosophical” Motivation, Continued

- New Keynesian macroeconomics incorporated monopolistic competition (a standard ingredient in much modern trade theory) in the benchmark macro model, but it “forgot” the free entry condition of rigorous monopolistic competition theory.

- It did so because the reason for monopolistic competition in New Keynesian models was simply to have price setting power, as a stepping stone for introducing nominal rigidity.

- So, scholars took a piece of the monopolistic competition model (price setting power) and “dropped” another (free entry).

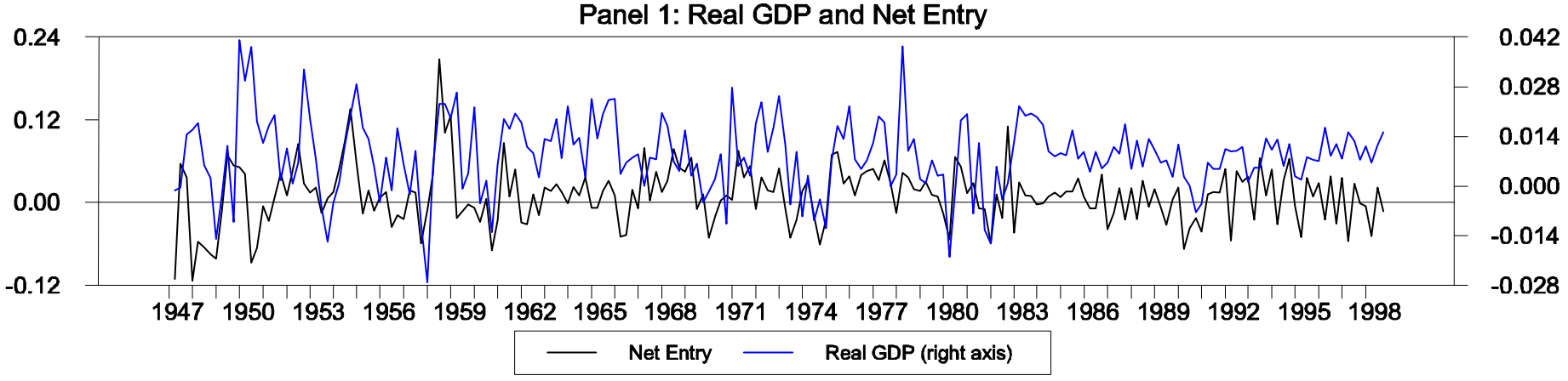
- Feenstra (2003, *Econ Letters*): A constant number of firms “violates the spirit of monopolistic competition.”

- The “sophisticated” argument to justify this was that “Entry is a long-run phenomenon. It does not take place at business cycle frequency.”

- Not true!

Entry and the Business Cycle

Both gross entry and net entry are procyclical



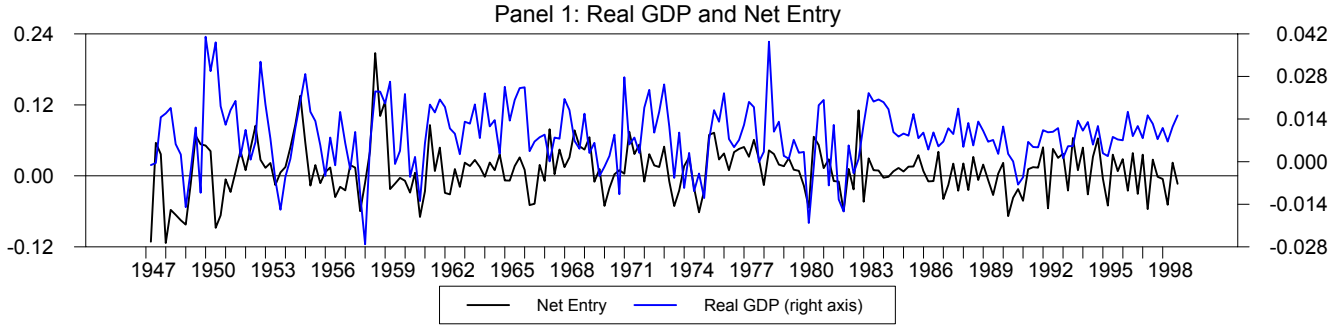
US growth rates of real GDP and net entry (new incorporations – failures)

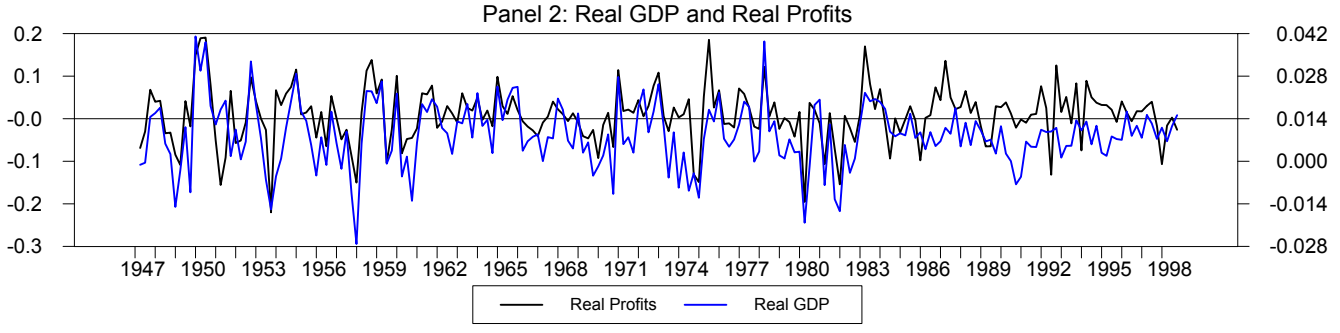
Producer Entry over the Business Cycle

- The number of producers in the economy varies over the business cycle.
  - For instance, net entry in the U.S. economy (new incorporations – failures) is strongly procyclical and comoves with real profits (also procyclical).
- Net entry tends to lead GDP and profit expansions.
- Can entry over the cycle matter for aggregate dynamics?

Growth Rates of Real GDP, Net Entry, and Real Profits

Sample period: 1947 - 1998





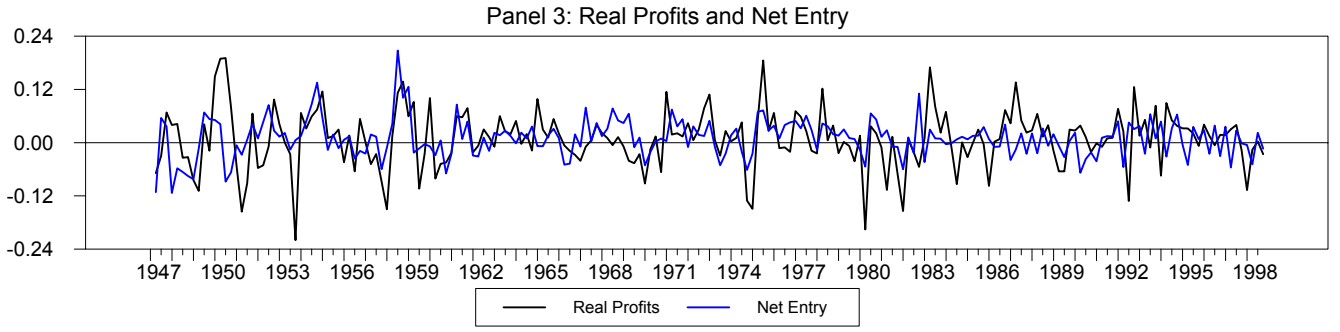
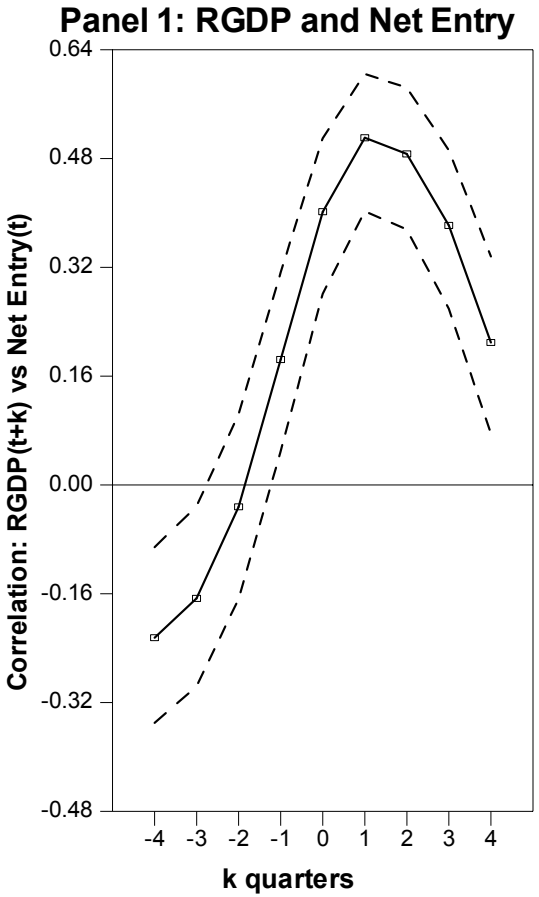
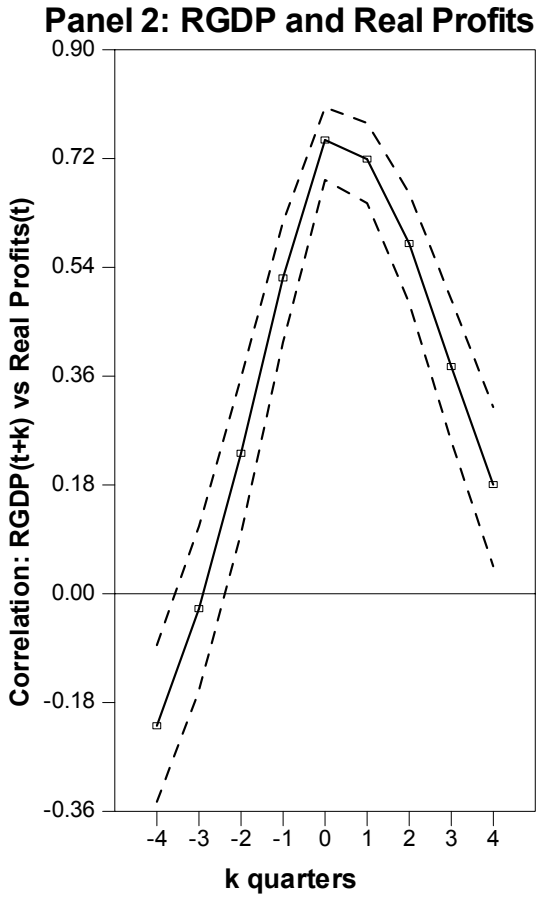
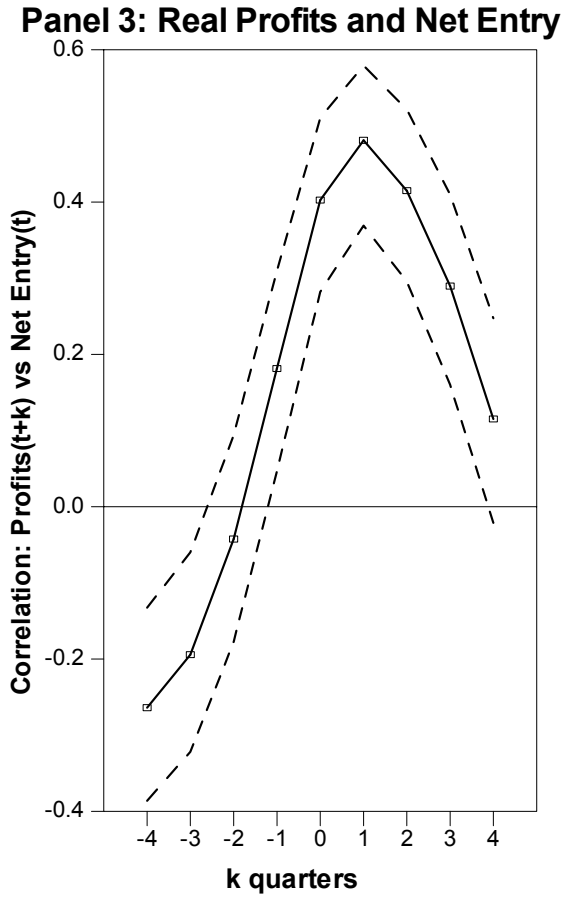


Figure 2. Cross Correlations: GDP, Net Entry, and Profits

Hodrick-Prescott filtered data in logs, 95% confidence intervals, sample period: 1947 - 1998







Producer *and* Product Entry over the Business Cycle

- Problem: Entering (or exiting) *firms* are usually small.

- So, maybe we do not miss much by abstracting from entry.

- However, although new firms account for a small share of overall production (2-3% for U.S. manufacturing), the contribution of new products (including those at existing firms) is substantially larger

New Products and Aggregate Output

- Bernard, Redding, and Schott (2010, *AER*) measure product creation and destruction within firms, across U.S. manufacturing.

- For every firm, they record production levels (dollar values) across 5-digit U.S. SIC categories.

- Within a 5-year census period :
  - 93% of firms (weighted by output) change their product mix.
  - Of these firms, 87% (weighted by output) both add and drop products.
  - Product creation over time is not just a firm-level secular trend (whereby firms steadily increase the range of their products).

New Products and Aggregate Output, Continued

- Most importantly, product creation and destruction account for important shares of overall production:
  - The value of new products (at existing firms) = 33.6% of overall output (–30.4% of output from product destruction).
  - These numbers are almost twice as large as changes at the *intensive margin* (production increases and decreases for the same product at existing firms).
  - The contribution of the *extensive margin* (changes in output from variation in the number of products) would be even higher at a finer level of disaggregation.
- Put together, product creation (both by existing firms and new firms) = 46.6% of output in a 5-year period, while product destruction (by existing and exiting firms) = 44% of output.
  - Minimal annual contribution of 9.3% (for product creation) and 8.8% (for product destruction).

New Products and Aggregate Output, Continued

- Broda and Weinstein (2010, *AER*) measure products at the finest possible level of disaggregation: the product barcode.

- Their data cover all of the purchases of products with barcodes by a representative sample of U.S. consumers.

- 9% of those consumers' purchases in a year are devoted to new goods not previously available.

  – Across product groups, almost a third of the growth rate of consumption expenditures is also reflected in the growth rate of expenditure shares in new product varieties.

- The market share of new products is four times that of new firms.

  – 92% of new product creation happens at existing firms.

The Cyclicality of Product Creation

- Importantly, Broda and Weinstein find that net product creation is strongly procyclical at quarterly frequency, with the procyclicality driven primarily by creation rather than destruction.

- Strong procyclicality of product creation is also confirmed by Axarloglou (2003, *JBusiness*) for U.S. manufacturing at a monthly frequency and by Lee and Mukoyama (2007, FRB Cleveland WP) for plant-level US Census data.

- Lee and Mukoyama also argue that while plant entry is highly procyclical, exit rates are roughly constant.

Entry and the Extensive Margin of Trade

- Entry and the extensive margin of trade are familiar ingredients in trade theory since Krugman's work (1979, *JIE*; 1980, *AER*; 1981, *JPE*).

- The literature—both theoretical and empirical—has highlighted a fundamental property of international trade patterns:

  – When trade varies across countries and/or within a country over time, so does the number of goods (and participating firms) embodied in that trade.

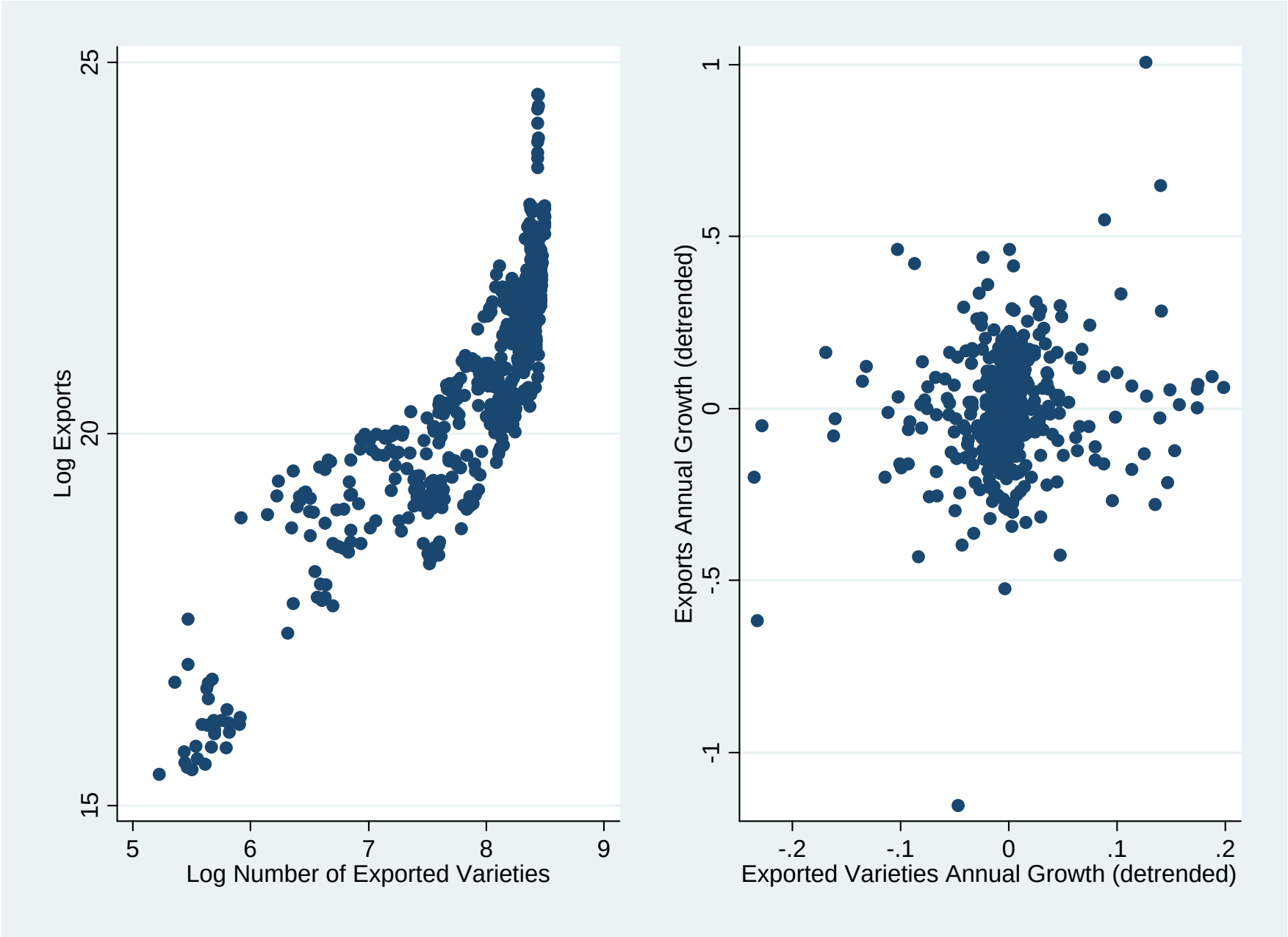
Entry and the Extensive Margin of Trade, Continued

- The next two figures depict the relationship between the number of traded varieties and aggregate exports (and exported varieties) and imports (and imported varieties) for a large sample of countries over the years 1994-2003.
  - A variety is defined as positive trade for a 6-digit Harmonized System (HS) product category.

- The left-hand side panel portrays the full panel relationship between varieties and trade (both in logs), while the right-hand side panel focuses on within-country growth variation:
  - For each country, the yearly growth rate is expressed as deviation from the country-level mean growth rate (and thus is purged of any country-level secular trend).
    - The left-hand side panel for exports clearly illustrates that the number of exported varieties is censored at a maximum level for the largest exporters.

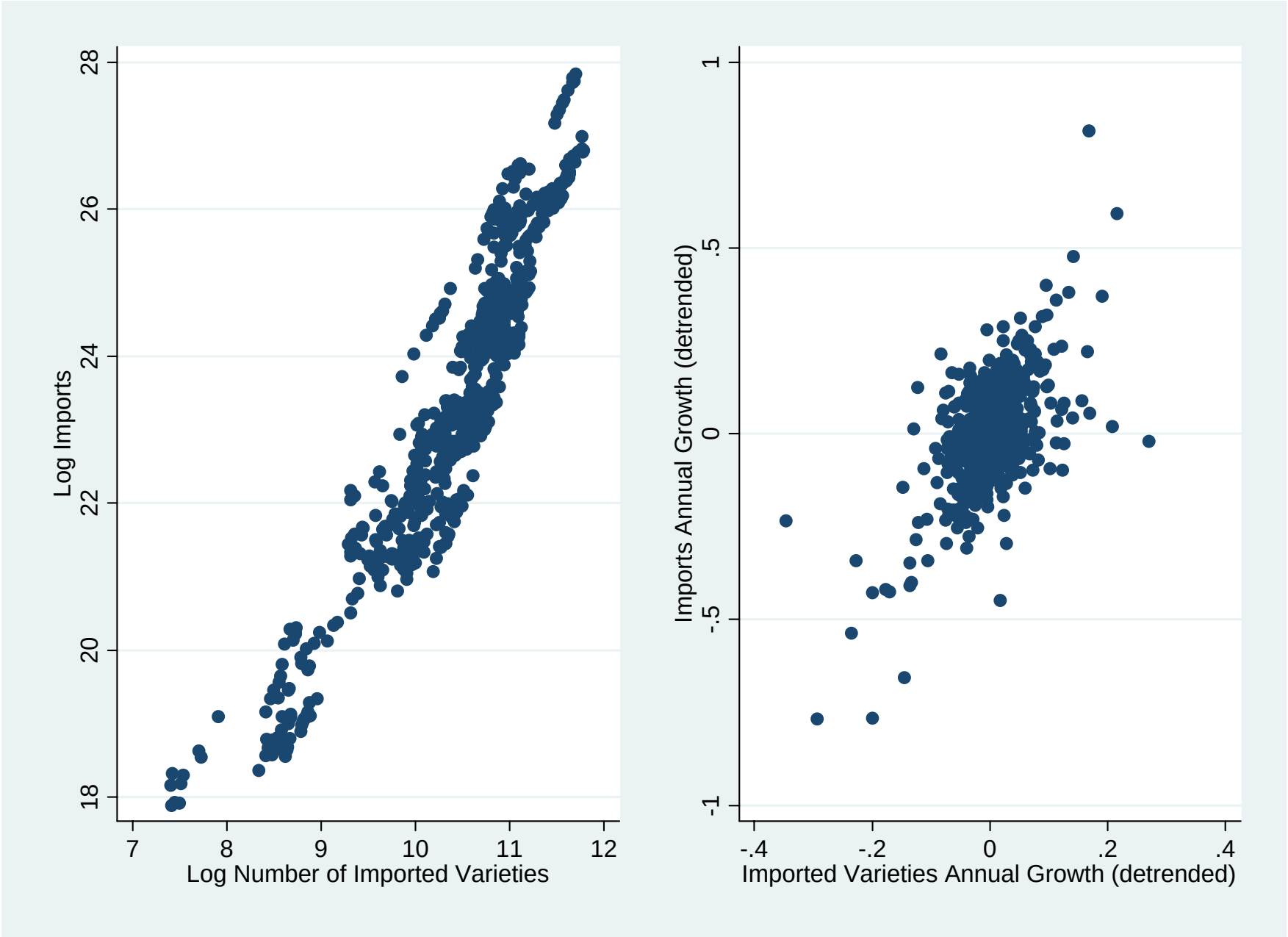
- The figures overwhelmingly document the important correlation between aggregate trade and the extensive margin of trade, both across countries and within countries over time.

Evidence on the Extensive Margin of Exports



Source: Broda, Greenfield & Weinstein (2006)

Evidence on the Extensive Margin of Imports



Source: Broda, Greenfield & Weinstein (2006)

Entry and the Extensive Margin of Trade, Continued

- Eaton, Kortum, and Kramarz (2004, *AER P&P*) have also documented this important extensive margin component of trade for bilateral trade for France, measuring the extensive margin as the number of French firms exporting to a particular destination.

- Incorporating this extensive margin into general equilibrium models and empirical analyses of trade has radically affected many aspects of the literature.

- Until recently, however, models of trade abstracted from short-to-medium-term dynamics, focusing only on steady-state effects.

- They abstracted from feedback loops from micro features of the model to aggregate dynamics and vice versa that can take place over time.

Entry and the Extensive Margin of Trade, Continued

- From a macroeconomist's perspective, the general equilibrium character of trade theory was not so *general equilibrium*, and dynamics are often not so *dynamic*.

- For instance, Melitz (2003, *Econometrica*)—the current workhorse model of trade—focuses on steady states, and does not model the financing of entry and its general equilibrium implications.

- There is no uncertainty other than pre-entry uncertainty on firm productivity and exogenous probability of firm destruction.

International Trade and Macroeconomic Dynamics with Heterogeneous Firms

- Ghironi and Melitz (2005, *QJE*—henceforth, GM) bridge the gap between modern international macroeconomics and trade theory by using Melitz's model of trade with monopolistic competition and heterogeneous firms as microeconomic underpinning of a two-country, dynamic, stochastic, general equilibrium (DSGE) model of international trade and macroeconomics.

- The paper is part of a research agenda that brings richer micro-level dynamics into macro and international macro analysis.
  - See Bilbiie, Ghironi, and Melitz (2012, *JPE*—BGM below) and references therein for the closed economy, macro implications of entry.

The Key Ingredients

- There are two key ingredients in GM's blend of trade and macro theory:

  a. *Entry*.

  b. *Endogenous non-tradedness within the tradeable sector*.

- Our theoretical model will equate a producer with a *production line* for an individual variety/good.

- New products are not only introduced by new firms, but also by existing firms, whose share of new product introduction is overwhelmingly larger (as noted above).

- We therefore take a broad view of producer entry (and exit) as also incorporating product creation (and destruction) by existing firms (although our model does not address the determinants of product variety within firms).

Producers, Products, and Firms

- In our model presentation, and in the discussion of results, there is a one-to-one identification between a producer, a product, and a firm.

- This is consistent with much of the macroeconomic literature with monopolistic competition, which similarly uses “firm” to refer to the producer of an individual good.

- However, the relevant profit-maximizing unit in our setup is best interpreted as a production line, which could be nested within a multi-product firm.

- The boundary of the firm across products is then not determined.

- Strategic interactions (within and across firms) do not arise due to our assumption of a continuum of goods, so long as each multi-product firm produces a countable set of goods of measure zero.

- In this interpretation of our model, producer entry and exit capture the product-switching dynamics within firms documented by Bernard, Redding, and Schott (2010).

Entry as Capital Accumulation

- Entry is interpreted as a form of capital accumulation: the introduction of new product lines (firms) for production of new varieties of goods, which requires (sunk) development and setup costs.

- Entry is tied to households' savings and investment decisions, as households invest by financing the creation of new firms.

- A new firm (product line), which can be thought of as a new unit of capital, is then combined with labor to produce output of the associated product variety.

Non-Tradedness of *Tradeables* and Changes in Traded Status

- Bernard, Eaton, Jensen, and Kortum (2003, *AER*—BEJK below): Only 21 percent of U.S. manufacturing plants export.

- Bernard and Jensen (2004, *RIE*): 38 percent of U.S. export increase between 1987 and 1992 was driven by entry of new exporters.

- Bernard and Jensen (2001, NBER WP 8349): Panel of U.S. manufacturing plants, 1987-1997: Roughly 13 percent of plants switch their export status in a given year.

- Two observations follow from these facts:

1. Non-tradedness within the tradeable sector is ubiquitous and therefore empirically relevant.

2. The changing margin between traded and non-traded status within the tradeable sector is also ubiquitous and empirically important at frequencies that can matter for business cycle transmission.

The Main Assumptions

- Productivity differs across individual, monopolistically competitive firms in each country.
- Firms face some initial uncertainty concerning their future productivity when making an irreversible investment to enter the domestic market.
- In addition to the sunk entry cost, firms face both fixed and per-unit export costs.
- Forward-looking firms formulate entry and export decisions based on expectations of future market conditions.
- Only a subset of relatively more productive firms export, while the remaining, less productive firms only serve their domestic market.
- We introduce this microeconomic structure in a flexible-price, international macro model (first under financial autarky, then allowing for international trade in bonds), and we study the consequences of this for aggregate dynamics.

Now Let's Think about Policy

- Labor and product market reforms are at the heart of the structural reform agenda advocated by many to boost performance of several advanced economies, notably in Europe and Japan.
- The theoretical case has been laid out by extensive literature that highlights long-term gains.
- No consensus on short- to medium-term impact, and even less on whether these effects depend on state of business cycle, other initial conditions (such as stringency of external borrowing constraints), and the conduct of macroeconomic policy.

Now Let's Think about Policy, Continued

- The fallout from recent/ongoing crises has given fresh importance to such transitional dynamics issues:
  - For given long-term impact of re-designing unemployment benefits and employment protection, do such reforms entail larger short-run costs if implemented during a recession? Or, in contrast, do they speed up recovery?
  - Does the removal of barriers to entry in product markets trigger more or less entry by new firms in a depressed economy, and what are the consequences for transition dynamics?
  - Are the effects of reforms stronger or weaker when countries have no access to international financial markets—as was the case to different degrees in euro area periphery countries throughout the recent eurozone crisis?
  - Does it matter whether monetary policy is constrained by the zero lower bound (ZLB) on interest rates?
  - What is the optimal monetary policy response to market reforms?
- I will address these questions by presenting results from a research agenda I have been developing with Matteo Cacciatore, Romain Duval, and Giuseppe Fiori.
  - Specifically: CDFG *JEDC* (2016), CDFG WP (2016), and CFG *JIE* (2015).

Market Reforms in the Time of Imbalance, CDFG *JEDC* (2016)

1. We add to fast-growing literature on short-run effects of labor and product market reforms by addressing the issue in a model that captures key empirical features of product and labor market regulation and reform as well as the narrative of policymakers.
2. First to use such a theoretical framework to assess how short-term effects of reforms vary according to the economy's cyclical position—and how the stringency of its external borrowing constraint further shapes effects.

Strategy

- Two-country, multi-sector model with endogenous producer entry and search and matching market frictions in the labor market.
  - Bilbiie, Ghironi, and Melitz (2012) and Ghironi and Melitz (2005).
  - Mortensen and Pissarides (1994) and den Haan, Ramey, and Watson (2000).
- We calibrate the model with parameter values from literature and to match features of macro data for euro area.
- Then study dynamic response to:

1. product market reform: reduction in regulatory costs of entry in non-tradable sector;
   - Focus on non-tradable sector to explore idea that deregulation of profession/service sectors should propagate as cost-reduction throughout economy.
   - Different from CDFG *JIMF* (2015), Cacciatore and Fiori *RED* (2016), and CFG *JIE* (2015) and *RiE* (2016).
2. labor market reform: decline in firing costs or decline in generosity of unemployment benefits.

Strategy, Continued

- Two alternative scenarios: Reforms are either implemented in normal times, assuming that the economy is at the steady state, or in the aftermath of a large adverse productivity shock that temporarily depresses the economy.
- To assess the role of external borrowing constraints, also consider financial autarky case.
- Finally, we discuss the implications of credible commitment to future reforms as opposed to implementing unanticipated reforms.

Results: Reforms in Normal Times

- Reforms increase output and employment in the long run.
- When implemented in normal times, short-term effects can be negative in some cases:
  - Product market deregulation involves gradual and costly reallocation of resources from incumbents to new entrants;
    - along the way, sunk entry costs need to be financed by (partly) reducing consumption and physical capital accumulation.
  - Removal of firing restrictions triggers lay-off of less productive workers, while re-employment takes time, the more so as such reform does not cause much entry of new firms.
  - Reduction in unemployment benefits entails no significant short-term costs because the reduction in the workers' outside option leads to wage moderation, which boosts job creation without triggering significant increase in job destruction.
- Deregulating economy always experiences current account deficit, as reforms stimulate (at least one form of) domestic investment.

Results: Reforms in the Time of Imbalance

- Business cycle conditions at the time of reform matter.

Firing Costs

- Reduction of firing costs entails larger and more persistent adverse short-run effects on employment and output when implemented in recession.
- For given aggregate productivity, positive firing costs imply that relatively unprofitable jobs survive job destruction.
- When aggregate productivity is below trend, share of unprofitable matches is greater than in steady state.
- Removal of firing costs leads to much larger job destruction, which further depresses aggregate demand and output.

Results: Reforms in the Time of Imbalance, Continued

Unemployment Benefits

- By contrast, reduction in unemployment benefits boosts employment and output by more in a recession than in normal times.
- Additional positive effect is due to the fact that, at times of high unemployment, larger pool of workers is searching for jobs.
- As a result, probability of filling a vacancy is higher, and thus expected cost of job creation is lower, in recession.
- Furthermore, since real wages are already low relative to steady state, the same reduction in unemployment benefits generates more job creation.
  - Positive effects on job creation prevail even when we allow the unemployment benefits reform to reduce directly aggregate income and demand.

Results: Reforms in the Time of Imbalance, Continued

Product Market Reform

- Impact of product market reforms less sensitive to business cycle.
- Recession has offsetting effects on the present discounted value of product creation:
  - On one side, lower aggregate demand reduces expected stream of profits.
  - On the other side, when productivity is below trend, markups are higher, which encourages product creation.
  - These two opposite effects largely cancel out, unless recession is very persistent—in the latter case, the reduction in aggregate demand prevails, and product market deregulation becomes more costly relative to the steady state in the short term.

Commitment to Reform

- Credible announcements of future deregulation induce sizable short-run dynamics, regardless of whether the announcement takes place in normal times or during downturn.
- Whether immediate effect of committing to future deregulation is expansionary or contractionary varies across reforms:
  - Announcement of future product market deregulation has contractionary effects in the short run, while the opposite is true for an unemployment benefits reform.
- Effects of reform announcements do not significantly depend on the state of the cycle.
- However, credible commitment to lower firing costs can significantly reduce adverse short-run effects of this reform during recession.
  - Since announcement stimulates job creation without triggering immediate job destruction, a smaller number of workers are displaced when reform is actually implemented.

Constraint on External Borrowing

- Existence of binding constraint on external borrowing can amplify the costs of adjustment to market reform.
- This is the case for product market deregulation:
  - With a closed current account, domestic households must reduce consumption and investment in physical capital by more to finance product creation, leading to lower aggregate demand in the short run.

A Policy Bottom Line

- The state of the economy matters for the short- to medium-run effects of market reforms.
- Policymakers should design reform packages appropriately to avoid the risk that short-term costs will derail support for reforms that would generate significant benefits over the longer horizon.
- This advice was incorporated in IMF WEO (April 2016) and many subsequent IMF documents.

More Details on Examples of Market Reforms in Our Model

- Permanent change in product and labor market policy parameters.
- Product market reform: reduction of red tape entry costs, f_R.
- Labor market reform:
  - reduction of firing costs, F,
  - reduction of unemployment benefit replacement rate, $b/\tilde{w}$ (the replacement rate).
- Reform size: from average levels in the euro area to corresponding U.S. level.
- We contrast deregulation in normal times vs. recession,
  - with external borrowing or under financial autarky,
  - unanticipated reform or commitment to future reform.
    - Government credibly announces that reform will be implemented within a year (after 3 quarters). The reform is then effectively implemented.
    - When economy is in recession, announcement takes place at time $1,$ and it is unexpected at time 0 (when negative productivity shocks in Home and Foreign are realized).

Market Reforms in Times of Imbalance

Benchmark Exercise

- Assume that at time 0 both Home and Foreign are hit by symmetric, negative productivity shock
- Calibrate shock so that we reproduce peak-to-trough decline of euro-area output of about 4 percent following the collapse of Lehman Brothers in September 2008 (set persistence of shock such that it takes about 4 years to return to initial steady state in absence of market reforms).
- Next, assume that at time 1 there is a permanent change in regulation (treated as unanticipated).
- Construct net effect of reforming in recession as difference between impulse responses to reform and impulse responses to negative productivity shock in absence of market reform.

Alternative Exercise

- Commitment to future reform as described above.

	σ_X		$Corr(Y_{R,t}, X_t)$		$Corr(X_t, X_{t-1})$	
Variable X	Data	Model	Data	Model	Data	Model
GDP (Y_R)	1.45	1.45	1	1	0.76	0.83
Consumption (C_R^M)	0.63	0.80	0.63	0.92	0.78	0.92
Investment (I_{KR})	3.02	3.02	0.92	0.89	0.90	0.94
Unemployment (U)	5.55	5.55	-0.87	-0.82	0.93	0.92
Vacancies (V)	9.01	11.00	0.80	0.78	0.93	0.55
$corr(U_t, V_t)$	-0.66	-0.26				

Note: Data moments are computed for the period 1995:Q1 to 2013:Q1.

Actual and model-generated data are HP-filtered with smoothing parameter equal to 1600.

$\sigma_X \equiv$ standard deviation of variable X (in percentage terms).

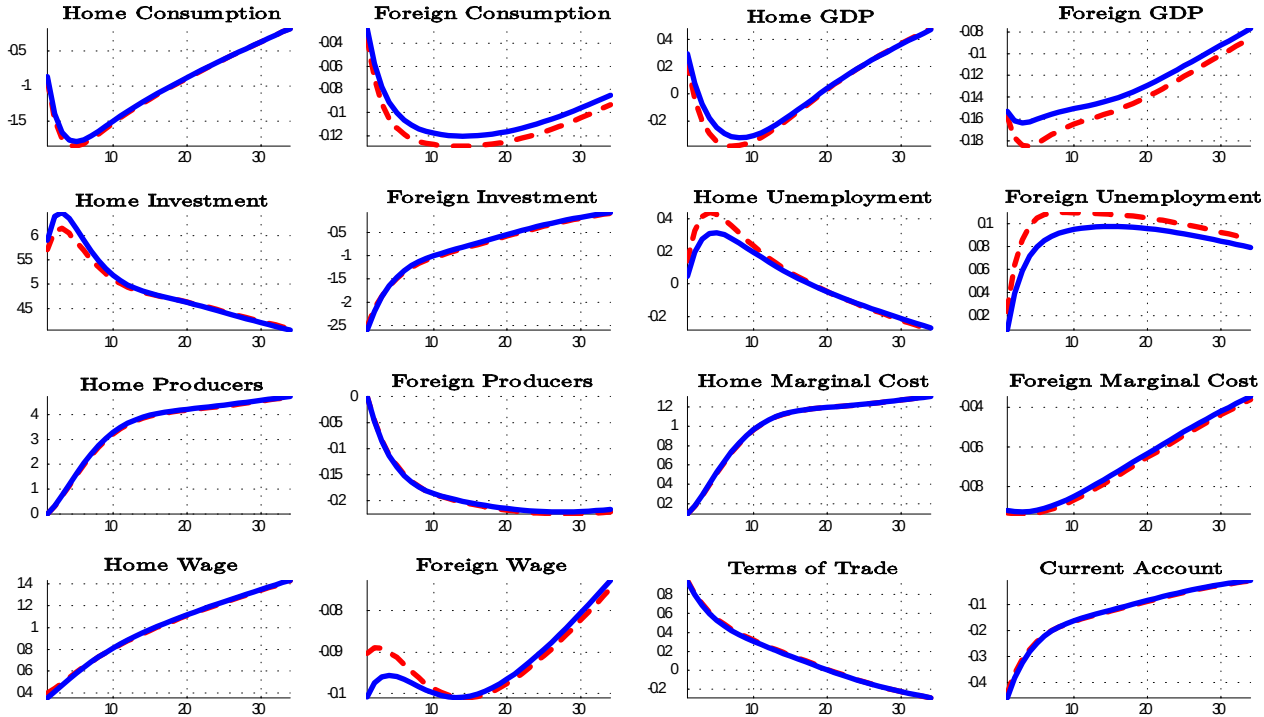


Figure 1. Home product market reform, steady-state (continuous lines) versus recession (dashed lines). Responses show percentage deviations from the steady state. Unemployment is in deviations from the steady state.

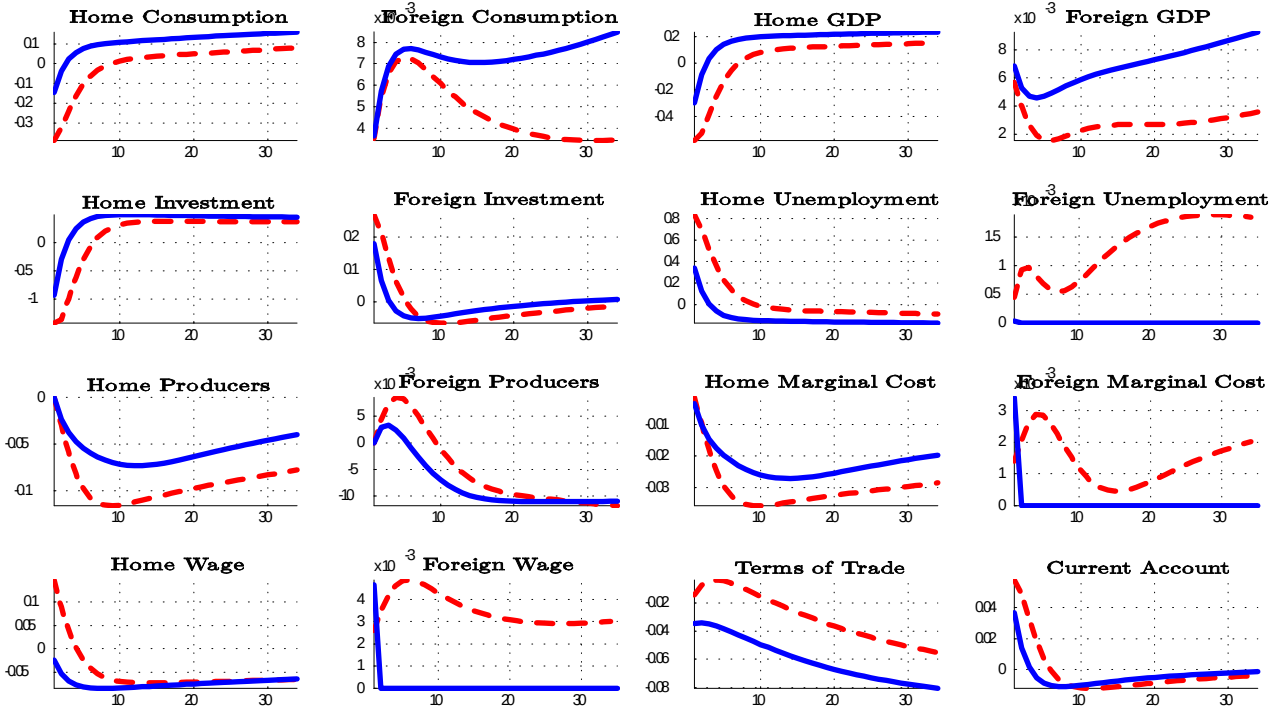


Figure 2. Home firing costs reform, steady-state (continuous lines) versus recession (dashed lines). Responses show percentage deviations from the steady state. Unemployment is in deviations from the steady state.

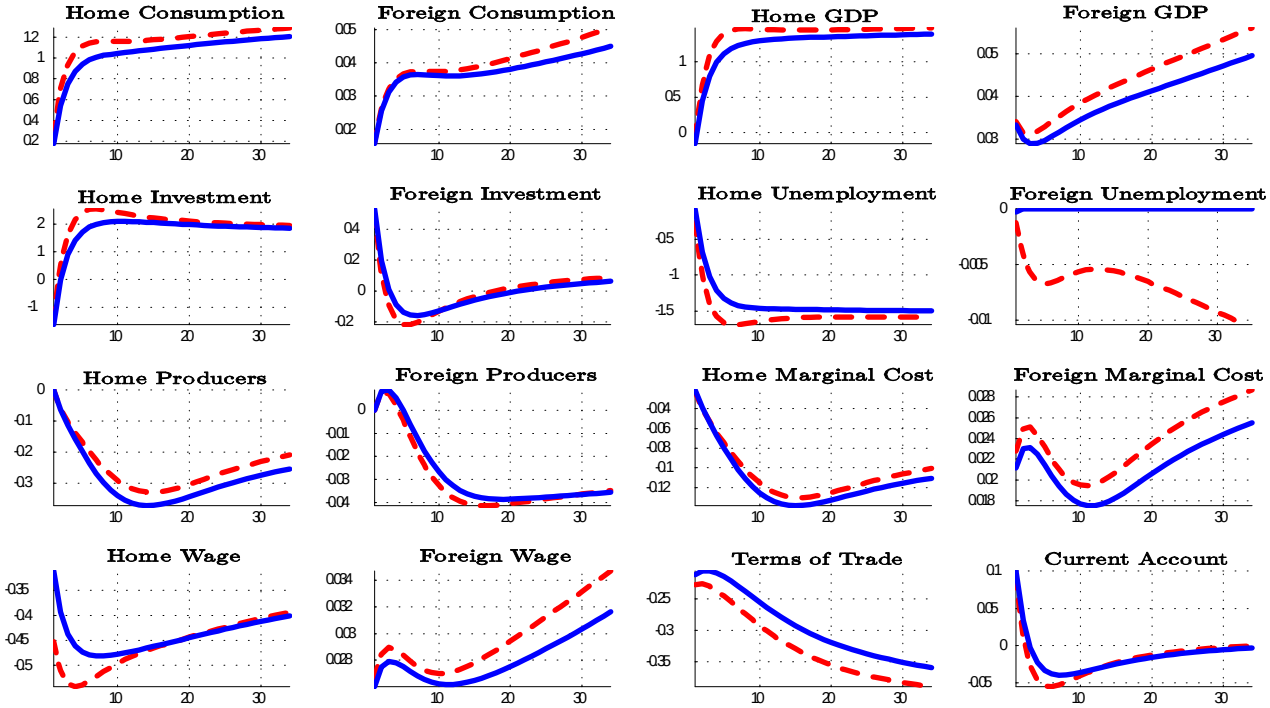


Figure 3. Home unemployment benefit reform, steady-state (continuous lines) versus recession (dashed lines). Responses show percentage deviations from the steady state. Unemployment is in deviations from the steady state.

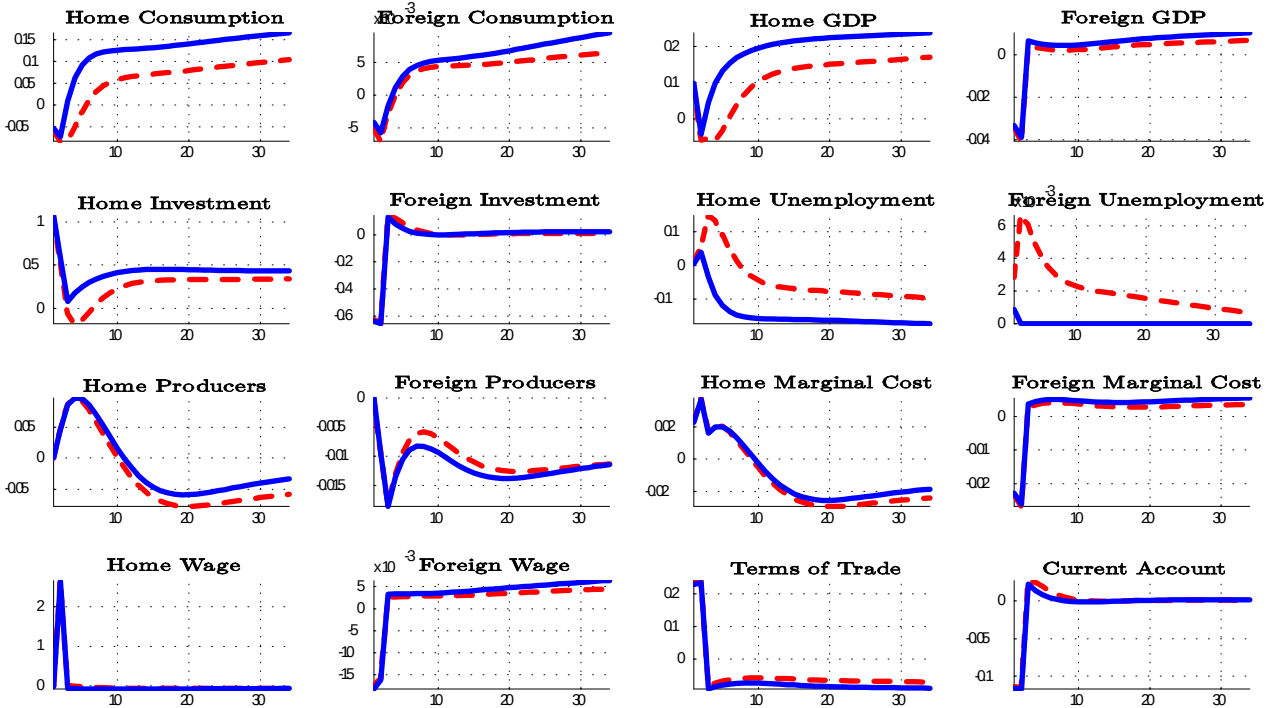


Figure 7. Anticipated Home firing costs reform, steady-state (continuous lines) versus recession (dashed lines). Responses show percentage deviations from the steady state. Unemployment is in deviations from the steady state.

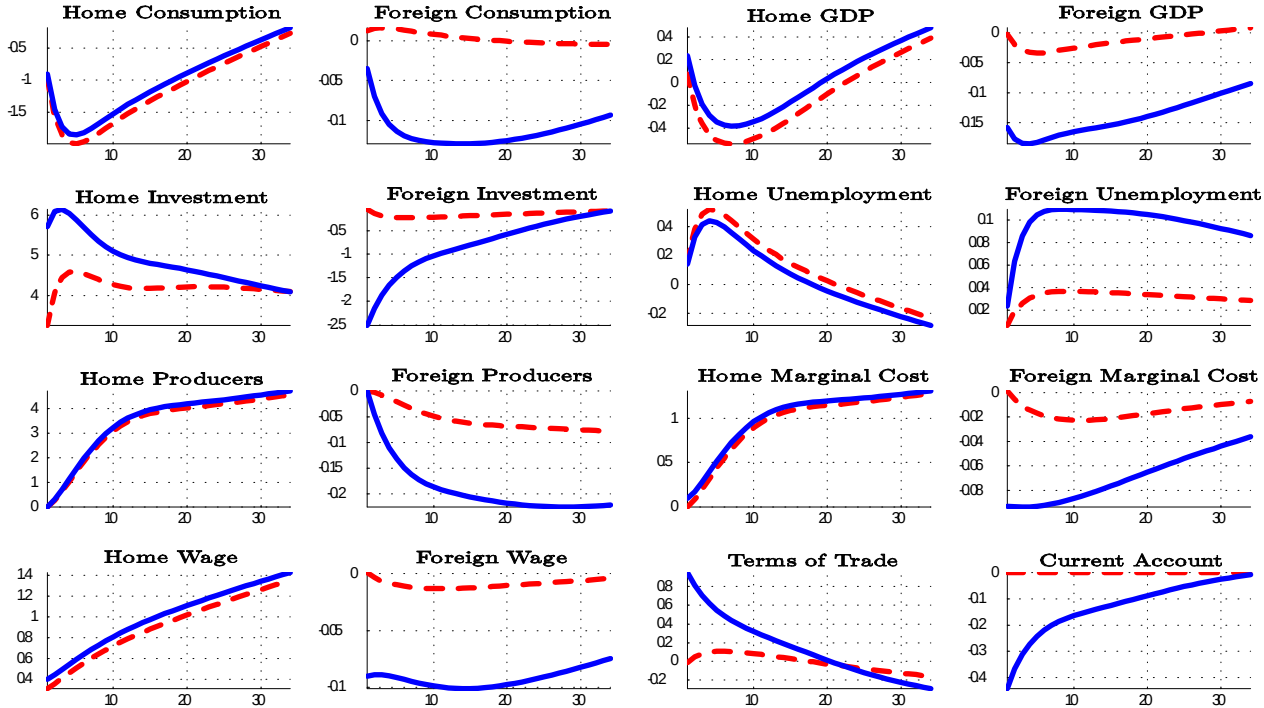


Figure 10. Home product market reform in a recession, open current account (continuous lines) versus financial autarky (dashed lines). Responses show percentage deviations from the steady state. Unemployment is in deviations from the steady state.

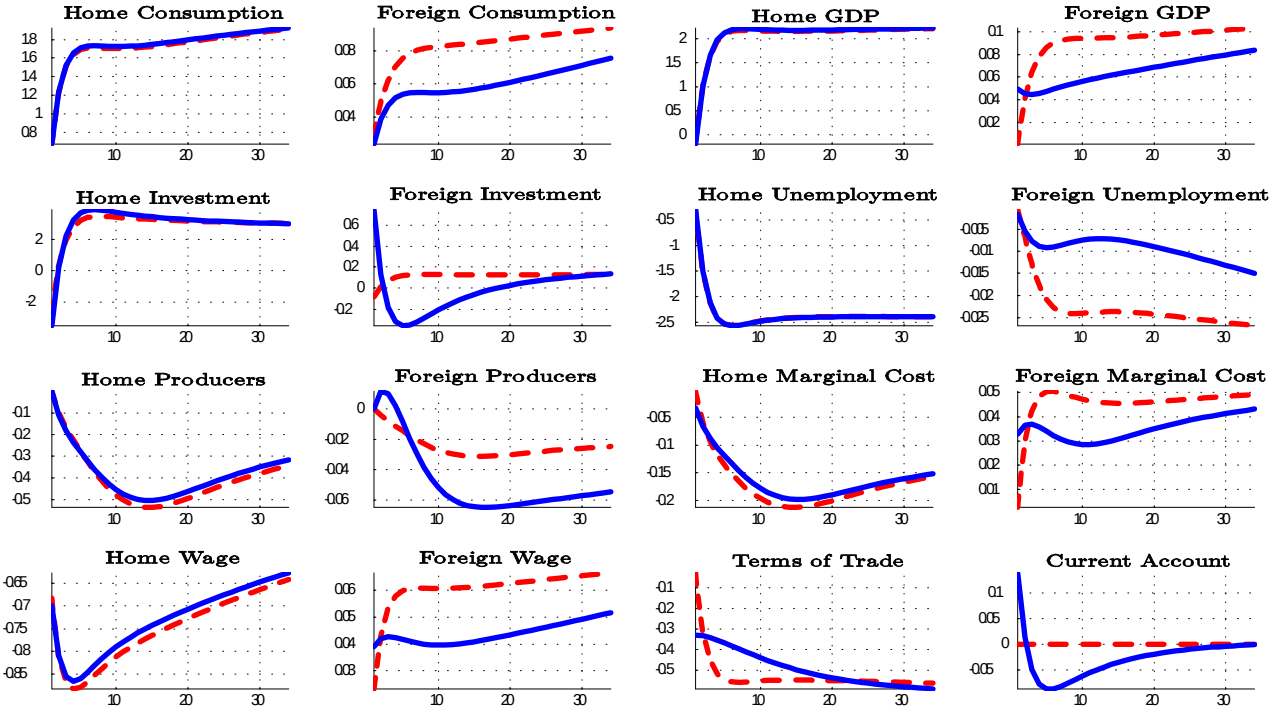


Figure 11. Home firing costs reform in a recession, open current account (continuous lines) versus financial autarky (dashed lines). Responses show percentage deviations from the steady state. Unemployment is in deviations from the steady state.

Market Reforms at the Zero Lower Bound, CDFG WP (2016)

- A central issue in the current economic environment involves the consequences of structural reforms when central banks face binding constraints on monetary policy easing, such as the so-called zero lower bound (ZLB) on nominal interest rates.
- At the heart of the debate lies the question whether reforms have important deflationary effects.
- As argued by Eggertsson (2010), in a liquidity trap, expectation of deflation increases real interest rates, thus depressing current demand further.
- Building on this insight, Eggertsson, Ferrero, and Raffo (2014, EFR) argue that structural reforms can have costly contractionary effects when monetary policy is constrained by the ZLB, since reforms fuel expectations of prolonged deflation.

Reduced-Form Reforms vs. Micro-Level Modeling

- Importantly, the analysis in EFR—and in several other papers that followed their approach—models market reforms as exogenous reductions in price and wage markups.
- This implies that reforms are automatically deflationary (and also that they depreciate the terms of trade and improve the external balance).
- However, from an empirical perspective, market regulation affects the incentives to create and destroy product and jobs by acting on barriers to entry and labor market legislation.
- Price and wage markup dynamics are endogenous outcomes of market reforms.
- The goal of this paper is to address the consequences of primitive changes in market regulation (rather than exogenous markup cuts) when the economy is in a deep recession that has triggered the ZLB on nominal interest rates.

Strategy

- Same model, plus sticky prices in non-traded sector, nominal assets, common monetary policy for the two countries: interest rate setting subject to ZLB constraint.
- We calibrate the model with parameter values from literature and to match features of macro data for euro area.

Strategy, Continued

- Then study dynamic response to:

1. product market reform: reduction in regulatory costs of entry in non-tradable sector;
   - Focus on non-tradable sector to explore idea that deregulation of profession/service sectors should propagate as cost-reduction throughout economy.
   - Different from Cacciatore, Duval, Fiori, and Ghironi (2015), Cacciatore and Fiori (2016), and Cacciatore, Fiori, and Ghironi (2015, 2016).
2. labor market reform: decline in firing costs or decline in generosity of unemployment benefits.

- Two alternative scenarios: Reforms are either implemented in normal times, assuming that the economy is at the steady state, or in the aftermath of a large adverse shock that depresses the economy and pushes monetary policy to the ZLB.

Results

- Our main conclusion is that while business cycle conditions at the time of deregulation matter for the adjustment, the presence of the ZLB does not per-se induce recessionary effects of market reforms.
- In fact, reforms can be more beneficial when the ZLB is binding, as observed for product market reform and joint deregulation of product and labor markets.
- This result reflects the fact that reforms do not have deflationary effects in the first place, and some are indeed inflationary, at least in the first phase of the transition.

Results, Continued

Intuition

- Consider first a reduction in barriers to producer entry.
- While such reform reduces price markups over time as a larger number of products results in higher substitutability, the downward pressure on prices is initially more than offset by two inflationary forces.

1. Lower entry barriers trigger entry of new producers, which increases demand for factors of production and thereby marginal costs.
2. Incumbent producers lay off less productive workers in response to increased competition.
   - Since remaining workers have higher wages on average, marginal labor costs rise.

- The latter effect also explains why lower firing costs—which induce firms to lay off less productive workers—are not deflationary either, even though layoffs reduce aggregate demand all else equal.
- Finally, while unemployment benefit cuts have a negative impact on wages and aggregate demand by weakening workers' outside option in the wage bargaining process, this deflationary effect is offset by the positive general equilibrium impact of the reform on labor demand, which increases wages other things equal.

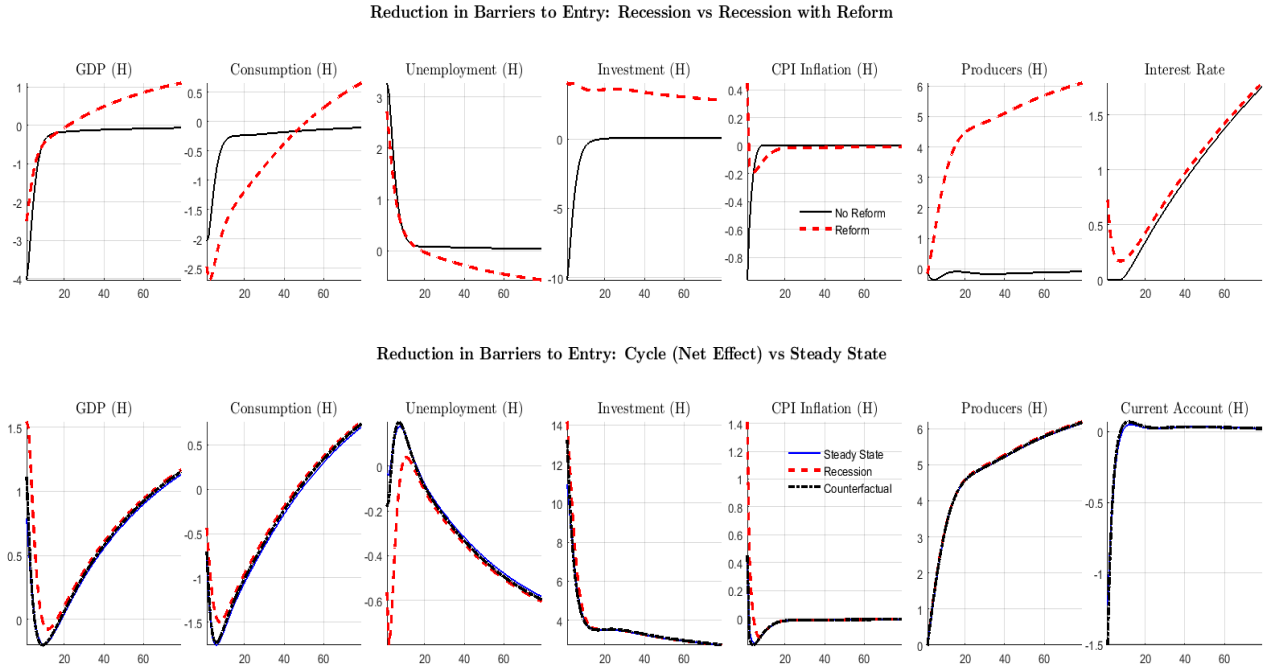


Figure 1. *Top panel*: recession (continuos lines) versus recession followed by product market reform (dashed lines); *Bottom panel*: net effect of product market reform in normal times (continuos lines), in a recession with binding ZLB (dashed lines), and in a recession where the interest rate is allowed to violate the ZLB (dotted lines). Responses show percentage deviations from the initial steady state. Unemployment is in deviations from the initial steady state.

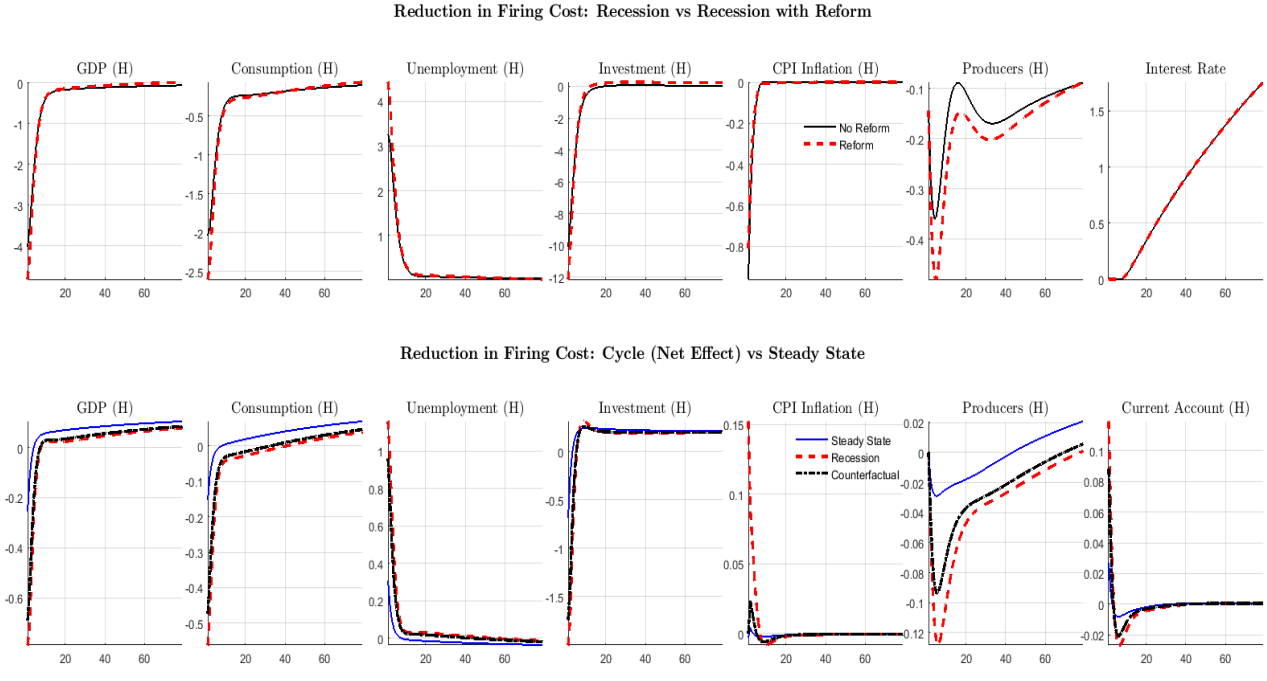


Figure 2. *Top panel*: recession (continuos lines) versus recession followed by firing cost reform (dashed lines); *Bottom panel*: net effect of firing cost reform in normal times (continuos lines), in a recession with binding ZLB (dashed lines), and in a recession where the interest rate is allowed to violate the ZLB (dotted lines). Responses show percentage deviations from the initial steady state. Unemployment is in deviations from the initial steady state.

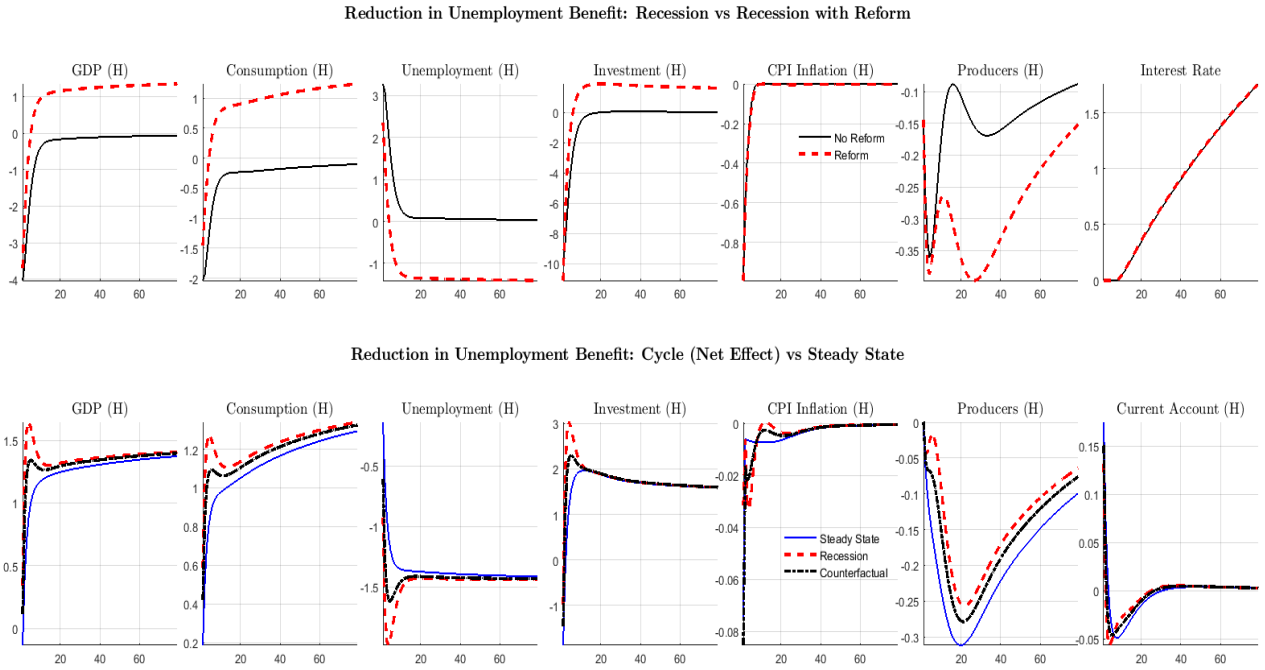


Figure 3. *Top panel*: recession (continuos lines) versus recession followed by unemployment benefit reform (dashed lines); *Bottom panel*: net effect of unemployment benefit reform in normal times (continuos lines), in a recession with binding ZLB (dashed lines), and in a recession where the interest rate is allowed to violate the ZLB (dotted lines). Responses show percentage deviations from the initial steady state. Unemployment is in deviations from the initial steady state.

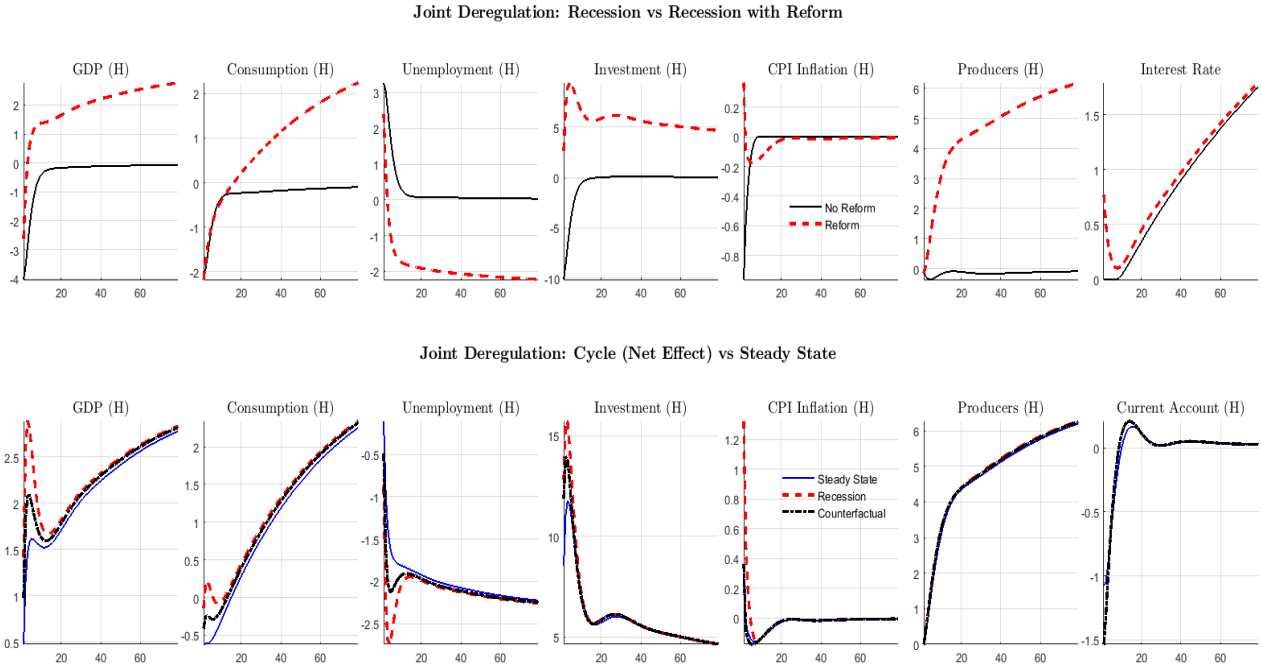


Figure 4. *Top panel*: recession (continuos lines) versus recession followed by joint product and labor market reform (dashed lines); *Bottom panel*: net effect of joint product and labor market reform in normal times (continuos lines), in a recession with binding ZLB (dashed lines), and in a recession where the interest rate is allowed to violate the ZLB (dotted lines). Responses show percentage deviations from the initial steady state. Unemployment is in deviations from the initial steady state.

Market Deregulation and Optimal Monetary Policy in a Monetary Union, CFG *JIE* (2015)

- Two-country monetary union model, product market dynamics in final, traded production; labor market reforms: worker bargaining power and unemployment benefits; product market reform: entry costs.
- Draghi (2015): Implementing reforms in environment of exceptional monetary expansion brings long-term benefits closer to the present.

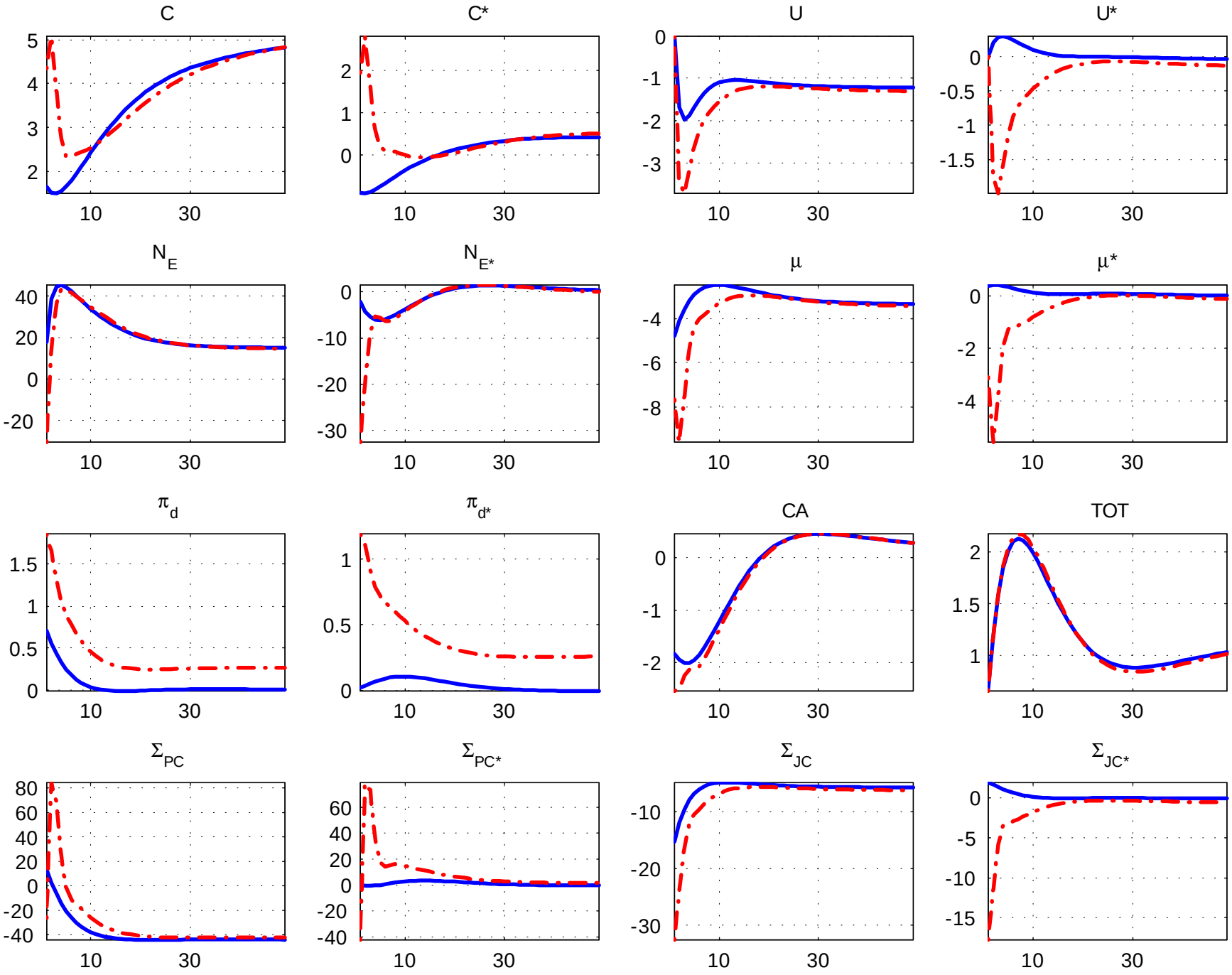


Figure 2: Home Product Market Deregulation, Historical Policy (Solid) versus Optimal Policy (Dashed).

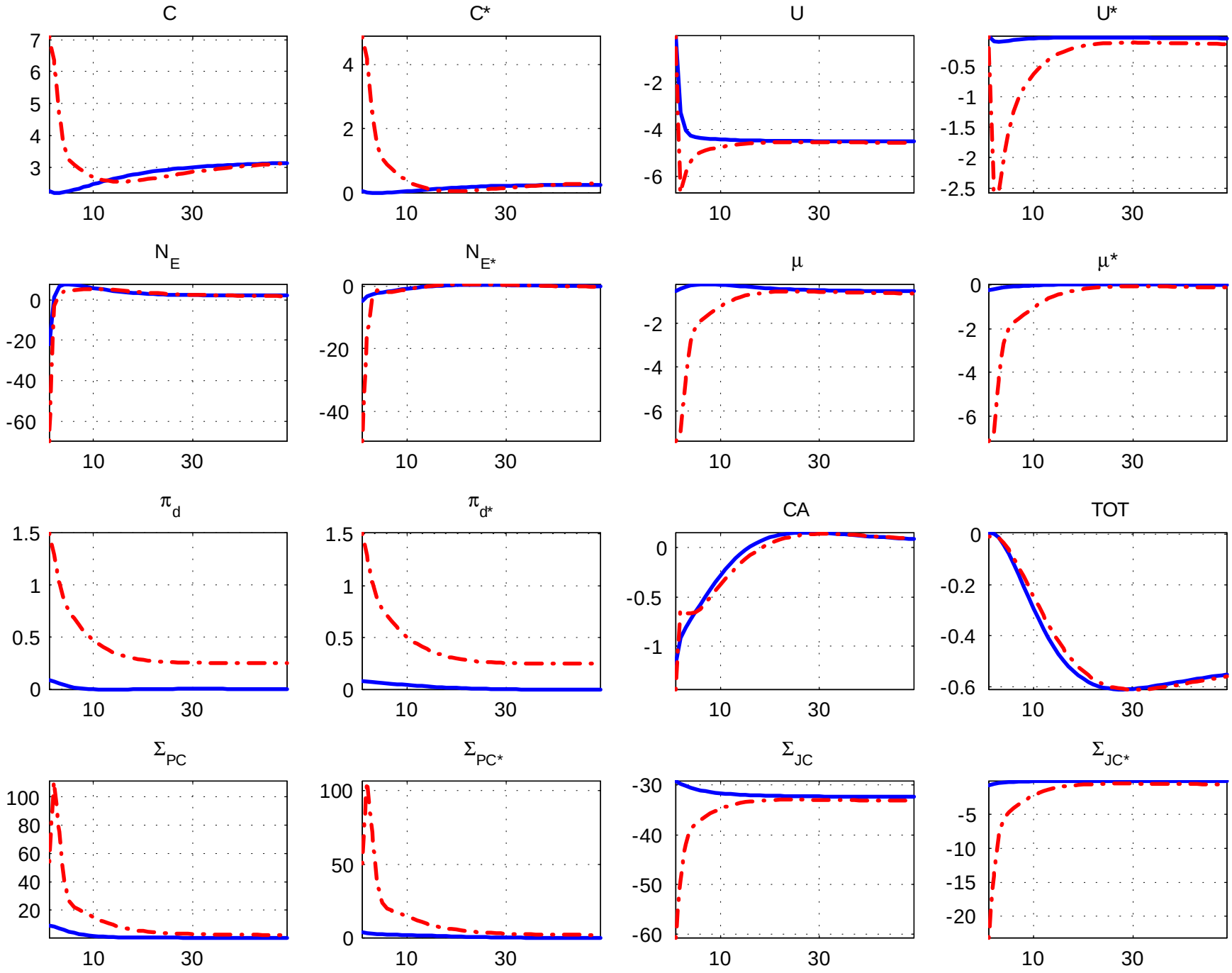


Figure 3: Home Labor Market Deregulation, Historical Policy (Solid) versus Optimal Policy (Dashed).

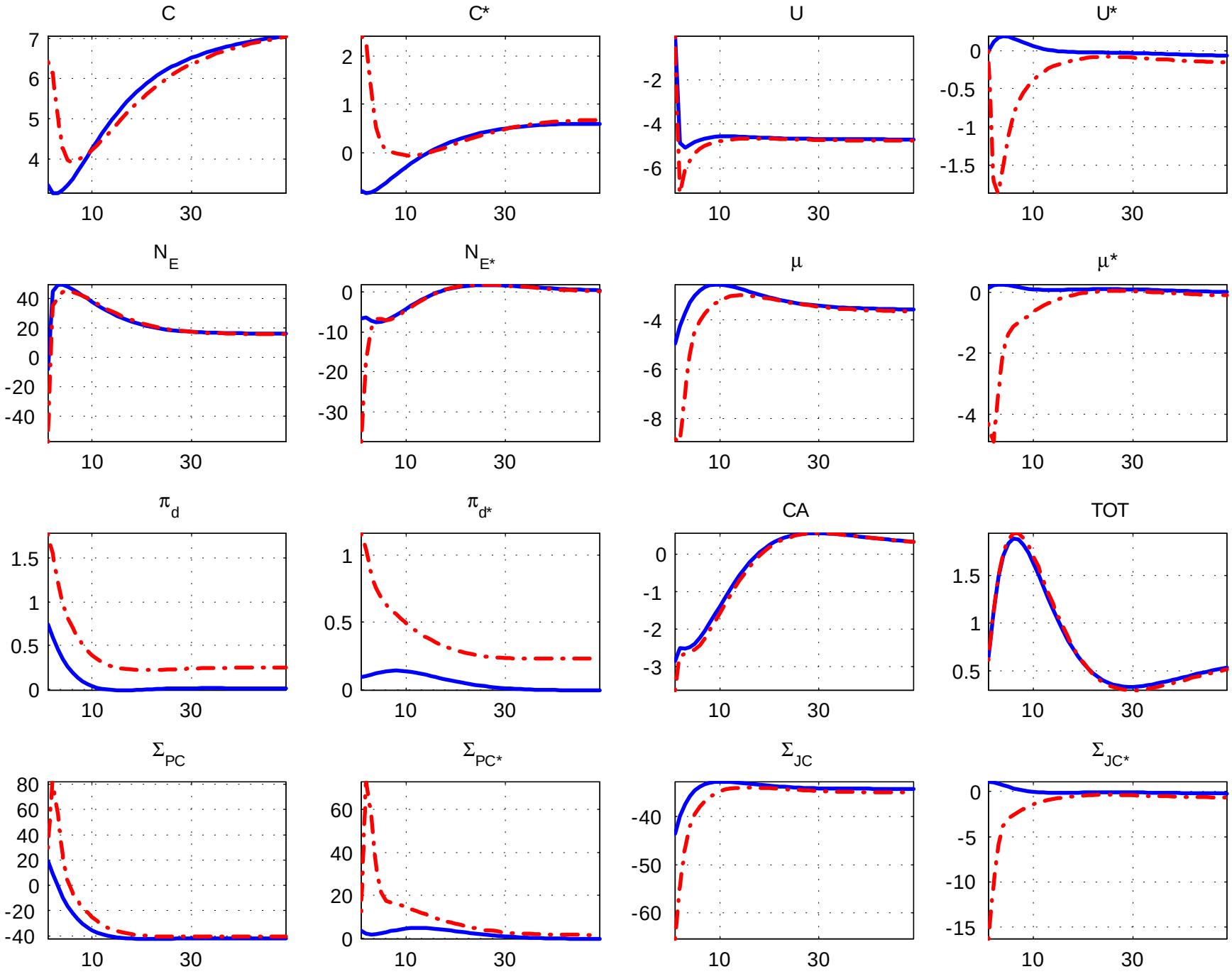


Figure 4: Home Product and Labor Market Deregulation, Historical Policy (Solid) versus Optimal Policy (Dashed).

Conclusions

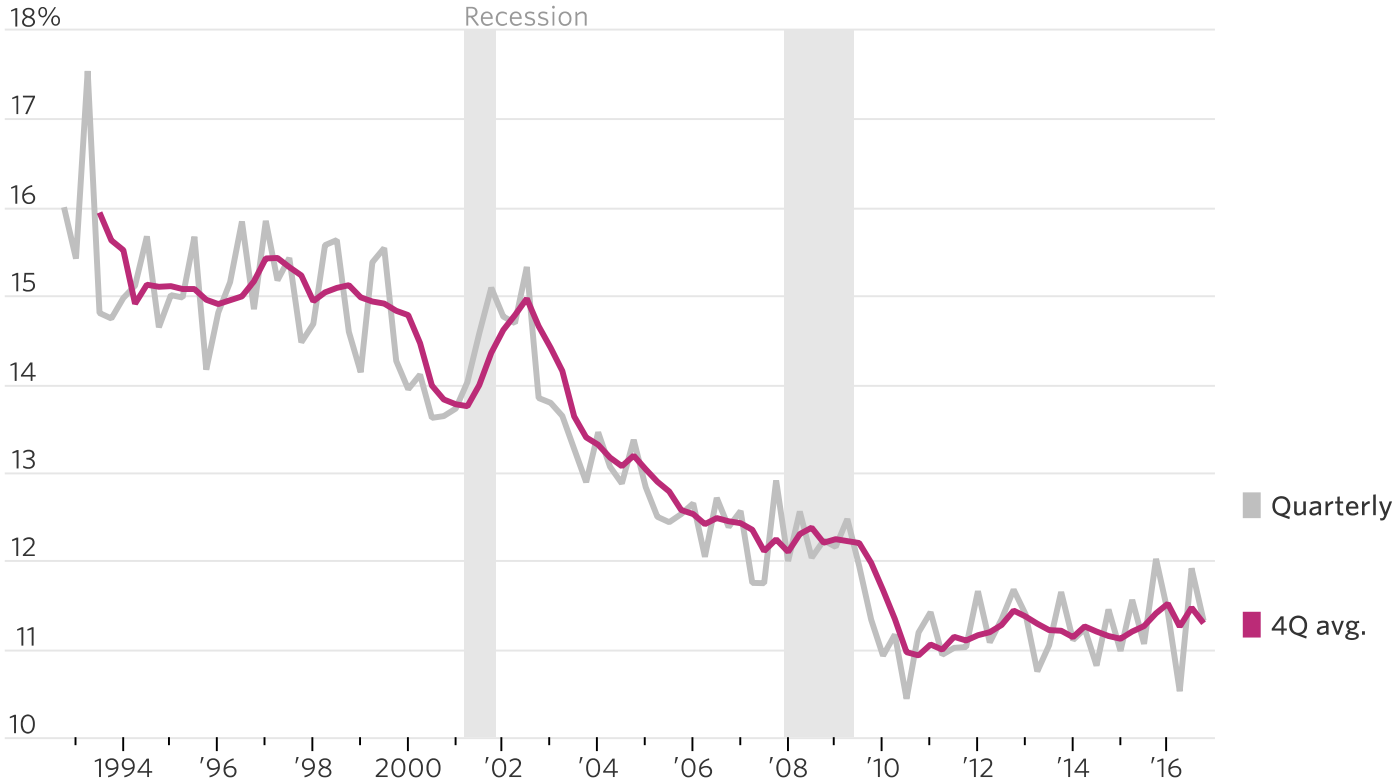
- Modeling micro-level market dynamics is important for analysis of structural reforms, how their effects depend on the conditions of the economy, and how they interact with macro policy.

- The results of this research agenda have provided theoretical background and confirmation for advice and intuitions by policymakers at various institutions.

- Ongoing agenda: Much remains to be done! And much of it has to do with challenges for the U.S. economy (see next figure for suggestive evidence).

Fits and Starts

Share of job gains from new establishments



Note: Seasonally adjusted

Source: Labor Department

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