Inclusion vs Inflation:
Stabilization Policy in the Wake of the Pandemic

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The views expressed in this paper solely reflect those of the authors and do not necessarily represent those of the Bank of Canada or its Governing Council

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Stabilization Policy in the Wake of a Recession

- **Traditional framing**: expand real aggregate economic activity
- But, extent and pace of recovery from a downturn vary across the skill distribution
  - Higher exposure and labor market hysteresis at the bottom
  - Even after aggregate indicators return to trend, earnings at the bottom continue to lag

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  - Even after aggregate indicators return to trend, earnings at the bottom continue to lag
- Jerome Powell, 11/2021: *We are attentive to disparities in the labor market, rather than just the headline numbers... A strong labor market delivers broad-reaching benefits and extends those benefits in particular to low- and moderate-income communities*
- Janet Yellen, 6/2023: *Intentional polices focused on driving an inclusive recovery have helped our economy withstand the challenges of the past two years*
- **New framing**: achieve a broad-based and inclusive recovery

Pros and Cons of Pursuing an Inclusive Recovery

- Inclusive recovery requires running the economy hot for longer
  - Pros: no group/community is left behind
  - Cons: heightened risk of surprise inflation which can erode real wage and interest income
- New stabilization policy trade-off: from output vs inflation to inclusion vs inflation

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- New stabilization policy trade-off: from output vs inflation to inclusion vs inflation
- Two aggregate constraints make this trade-off harder to navigate:
  1. **ZLB**: amplifies the risk of labor market hysteresis for low-wage workers
  2. **Supply constraints**: exacerbate the risk of unexpected inflation surges

Pandemic Business Cycle

- Stark example of policy facing this inclusion-inflation trade-off

- Fed pursued an “inclusive recovery” at a time when both aggregate constraints were salient

- Conflicting views on how successful stabilization policy was

  Larry Summers, 12/2022: *Under just about any theory that we have in economics, inflation at this moment was quite predictably an outcome of the policies that were being pursued*

  Janet Yellen, 1/2025: *Strategies designed to suppress the inflationary surge would have required an unacceptably high level of unemployment*

- **This paper: quantitative model to assess this trade-off in the context of the pandemic episode, and run policy counterfactuals**

Model

Alves-Violante (2024). *Monetary Policy Under Okun's Hypothesis*

Labor Market States and Skill Dynamics

- Time is continuous. Island economy

$$s = \begin{cases} e, & \text{employed} \\ u_1, & \text{unemployed, eligible for UI} \\ u_0, & \text{unemployed, ineligible for UI} \\ n_1, & \text{active non-participant} \\ n_0, & \text{passive non-participant} \end{cases}$$

- Skill indexed by z

$$d \log z_t = \left\{ -\rho_z \log z_t + \mathbb{I}_{\{s_t = e\}}\, \delta_z^+ - \mathbb{I}_{\{s_t \neq e\}}\, \delta_z^- \right\} dt + \sigma_z dW_t$$

▶ participation ▷ job-acceptance λ, η exogenous rates

	e	u_1	u_0	n_1	n_0
e	$\ddots$	λ_{zt}^{eu}	$\times$	▶	η^{en_0}
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(1) Unemployment exposure **(2) Labor force attachment** **(3) Persistence**

Worker's Problem

- Demographics:
  - individuals die at rate ϱ
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- Budget constraint:

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\begin{aligned}
c_t + \dot{a}_t &= r_t a_t + \phi, && \text{if } s \in \{n_0, n_1, u_0\} \\
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- Workers' decisions:

consumption/saving (optimal control) participation (optimal stopping) job acceptance (Poisson switching)

Value function for employed worker

$$v_0^e(a,z) = \max_{\{c_t\}_{t\geq 0},} \quad \mathbb{E}_0 \left[\int_0^{\mathfrak{t}^{\min}} e^{-\rho t} \mathfrak{u}^e(c_t, h_t)\, dt \right]$$

$$s.t. \qquad a_t \geq 0$$
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$$\left. + \mathbb{I}_{\{\mathfrak{t}^{\min} = \mathfrak{t}^u\}} e^{-\rho \mathfrak{t}^u} \; v_{\mathfrak{t}^u}^{u_1}(a_{\mathfrak{t}^u}, z_{\mathfrak{t}^u}) \right]$$

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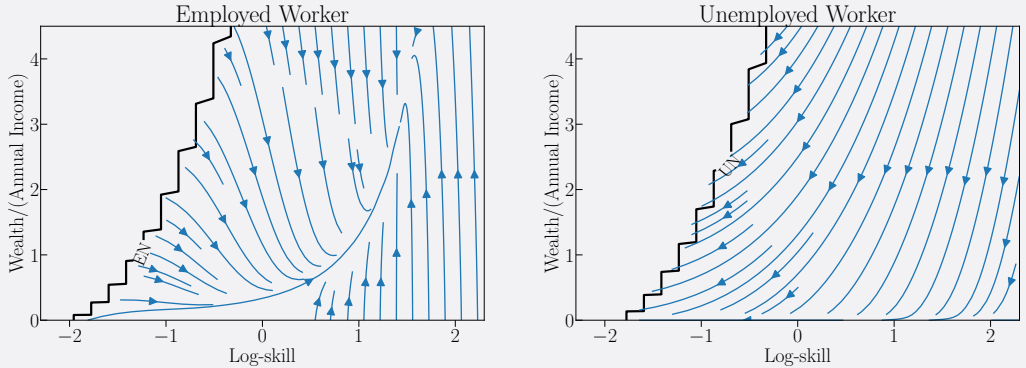
- $\mathfrak{t}^*$: worker's participation choice

Participation Decision over the State Space



- Unemployment spells reduces labor force attachment of low-skilled workers
  - wealth decumulation keeps them attached
  - skill depreciation δ^- pushes them away from participation

NK Production Block

- Monopolistic labor unions set the wage rate subject to nominal rigidities à la Rotemberg

  → wage Phillips curve

- Monopolistic intermediate-good producers hire labor and set prices s.t. nominal rigidities

  → price Phillips curve

  also subject to an exogenous time-varying maximum capacity constraint $\overline{Y_t}$

- Nominal wages are more rigid than prices

  → price inflation can lead to persistent real wage erosion

- Competitive firms produce final good (numeraire) by aggregating intermediates

- Representative mutual fund holds all firm equity and government debt

Government

- Monetary authority follows one between:

  1. Inflation Targeting (IT), i.e. standard Taylor rule

  2. Lower for Longer (LfL), i.e. asymmetric rule that keeps rates low as long as cumulative past shortfalls of inflation *and* employment are both reabsorbed

  both subject to the Zero Lower Bound

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- Fiscal authority:

  1. Spends, issues debt, and taxes/transfers to households

  2. Labor taxes adjust to keep debt dynamics in check

Sources of Aggregate Fluctuations

1. **Labor supply shock:** wedge in the disutility of work

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$$(\rho + \chi)(\pi_t - \pi^*) - \dot{\pi}_t = \theta\Big(\log w_t - \log \Gamma\Big) + \zeta_t^m + \zeta_t^{cc}$$

Isomorphism: mark-up shock or multiplier on capacity constraint [Comin-Johnson-Jones 2023]

Difference: ζ_t^m exogenous, but ζ_t^{cc} endogenous so it changes across counterfactuals

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Labor market transition rates fluctuate with hours per worker, e.g.

$$\log \lambda_{zt}^{eu} = \vartheta^{eu} \log h_t$$

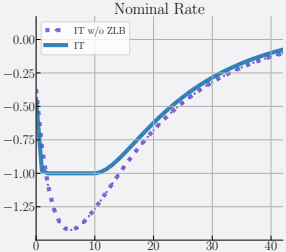
Solution Method

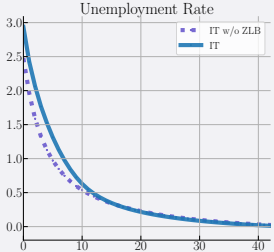
Limitations of Current Solution Method

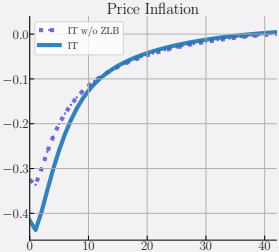
- We solve for a perfect foresight equilibrium: shocks are unanticipated, agents are continuously surprised by shocks hitting the economy
- In a full RE equilibrium, households and firms would internalize future uncertainty about ZLB and supply constraints binding which would change their current decisions
- IRFs computed via first-order perturbation around deterministic steady-state, based on SSJ
- We are able to deal with aggregate constraints within our solution method
- Two shortcomings:
  - Pandemic was a large shock: we scale up the response to a small shock
  - Model has several aggregate shocks which could interact and create non-linearities
- Nonlinear IRFs are hard to compute, especially in models without K_t pinning down r_t

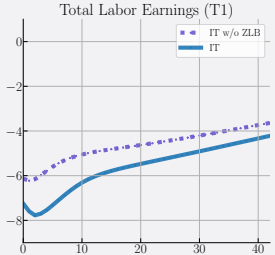
Stabilization Policy Under Aggregate Constraints

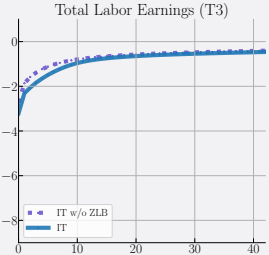
ZLB Amplifies Labor Market Hysteresis



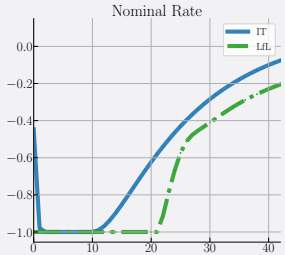


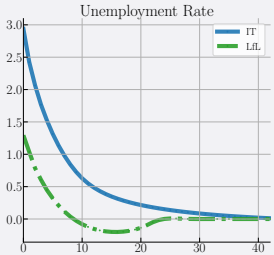


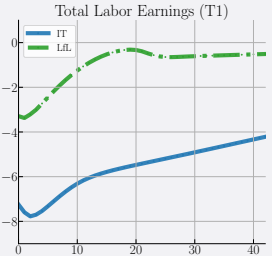


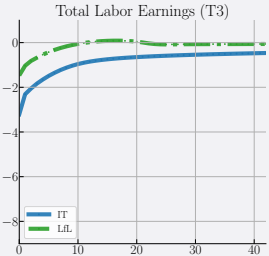


LfL Deals with ZLB More Effectively than IT

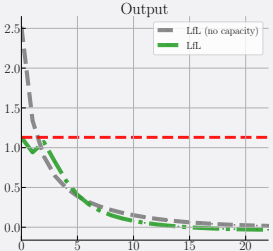


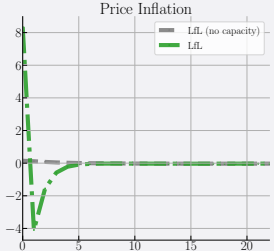


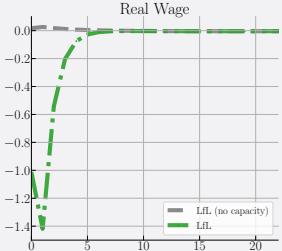


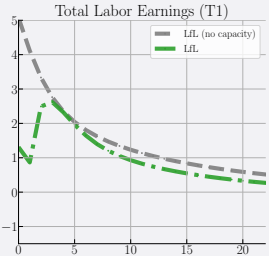


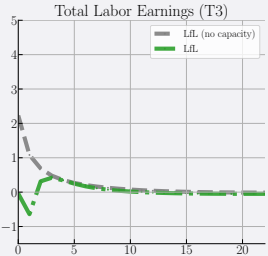
Capacity Constraint Amplifies Wage Erosion from Inflation



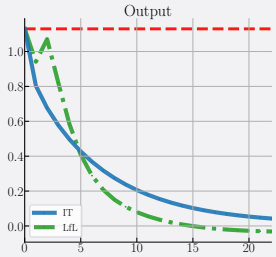


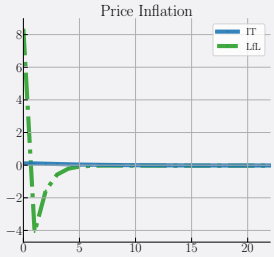


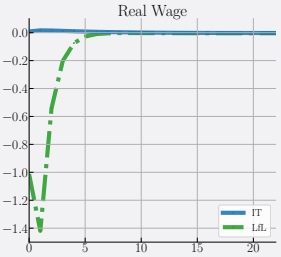


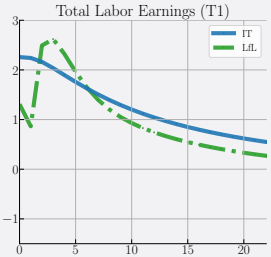


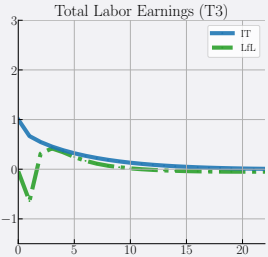
IT Deals with Capacity Constraint More Effectively than LfL











Key Findings from IRF Analysis

- LfL is a better antidote to labor market hysteresis at the ZLB than IT
- But it makes supply constraints more likely to bind, and inflation spikes more likely to occur
- Same trade-off exists for fiscal policy which commits to protracted fiscal support
- ZLB hurts more the bottom of the distribution (extensive margin hysteresis), while supply constraints also hurts the top of the distribution (wage erosion)

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When both constraints are salient, the implementation of stabilization policy is challenging

Pandemic Business Cycle

Simulation of the Pandemic

1. Filtering of aggregate shocks (2005Q1 to 2024Q4)

- 3 time series: employment, unemployment, and inflation
- 3 shocks: labor supply, demand, and cost-push shock
- Assumption: half of cost-push during 2021-2022 is due to supply constraints $\rightarrow \zeta_t^m, \overline{Y}_t$

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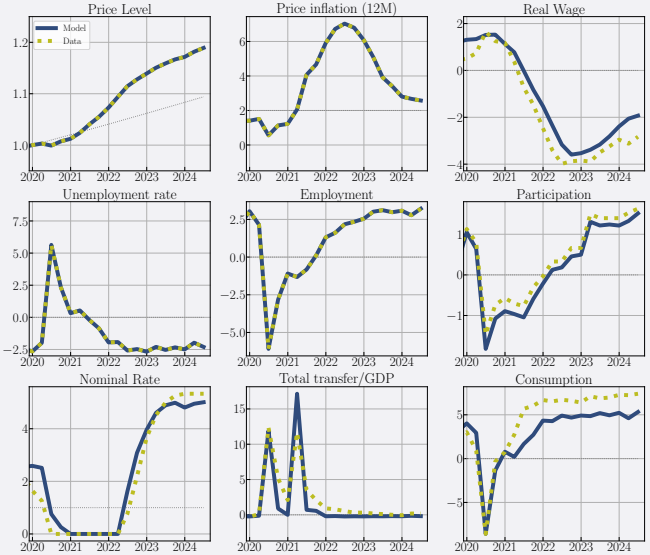
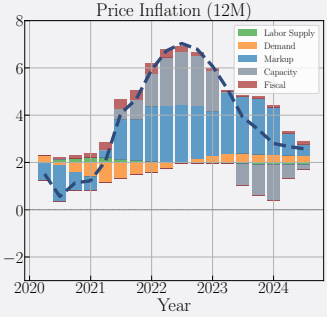
2. Policy response to the shocks

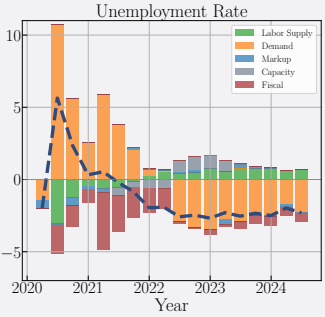
- Monetary policy: switch from IT to LfL in 2020:Q4
- Fiscal policy: $1.8 trillion directed to households
  - Combination of transfers (EIP) and higher/extended UI benefits
  - Two major rounds of fiscal support: **Round I** in 2020Q2 and **Round II** in 2021Q1

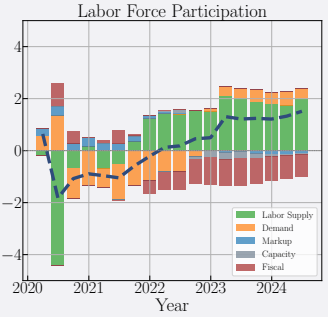
Data vs Model



Shock Decomposition







Counterfactuals

Counterfactual Policy Experiments

We investigate counterfactual macroeconomic dynamics under a more conservative policy stance:

1. Monetary policy: what if the Fed had followed a strict IT all along, instead of LfL?

- Evaluate criticism that Fed started hiking too late

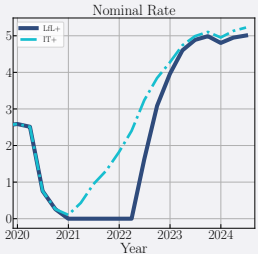
2. Fiscal policy: what if fiscal relief had been limited to the first 'emergency' round?

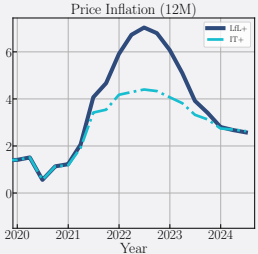
- Evaluate criticism that fiscal authority overreacted

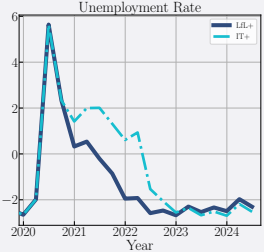
Trade-off: less inflation/income erosion at the cost of a less inclusive recovery on extensive margin

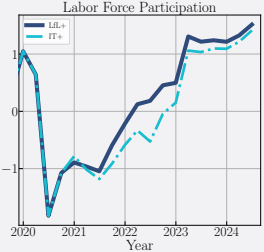
Monetary Policy Counterfactual

Aggregate Outcomes

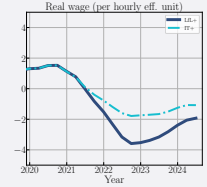


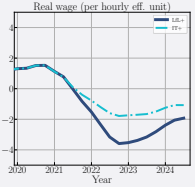


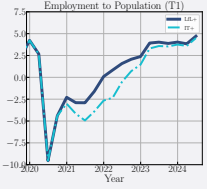


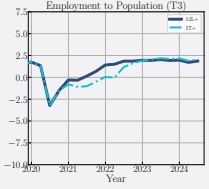


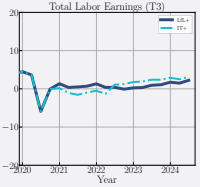
Distributional Outcomes



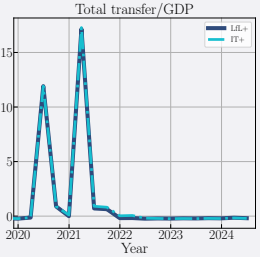


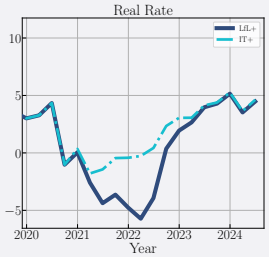


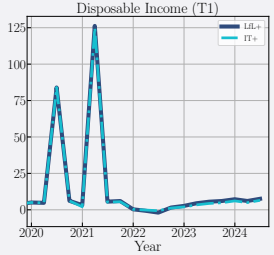


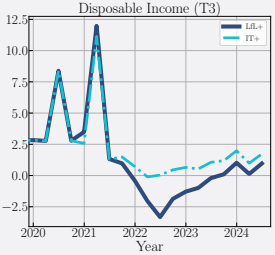


Disposable Income









Key findings from counterfactuals

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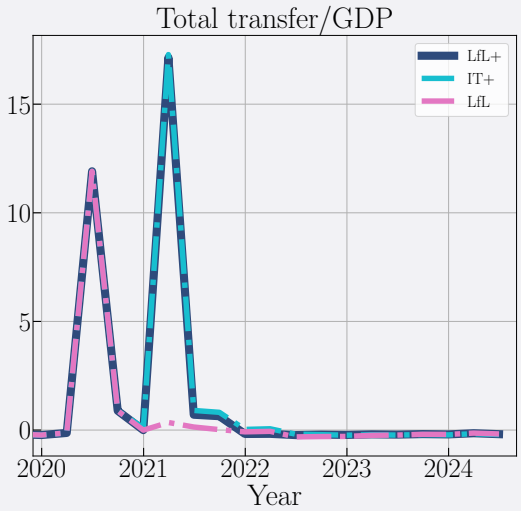
  → **everyone better off, but especially the top**

- Would have led to earnings losses via weaker labor market and stronger scarring effects

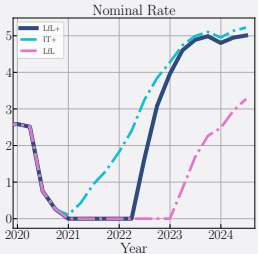
  → **bottom worse off**

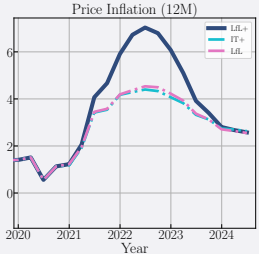
Fiscal Policy Counterfactual

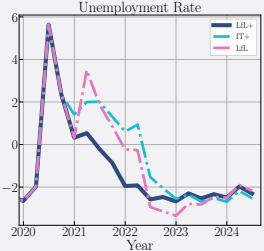
No Round II of Fiscal Support

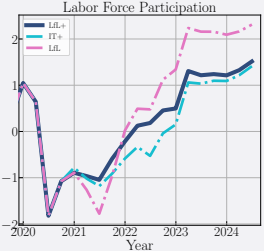


Aggregate Outcomes









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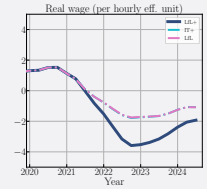

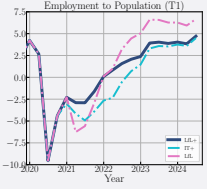

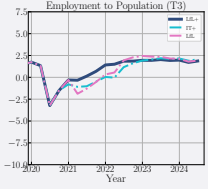

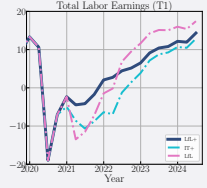

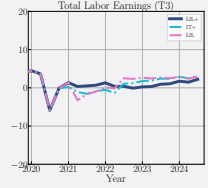

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  → **everyone better off, but especially the top**

- Would have led to earnings losses via weaker labor market and stronger scarring effects

  → **bottom worse off**

2. Tighter fiscal policy

- Would have avoided much of the inflation spike ...

  → **everyone better off, but especially the top**

- Would have led to (mechanically) lower incomes in 2021, but to earnings gains in 2022 because of LfL and weaker negative wealth effects from fiscal transfers

  → **everyone worse off in 2021, but better off in 2022**

Taking Stock

- After the pandemic, stabilization policy found itself between a rock and a hard place
  - Squeezed between ZLB and aggregate supply constraints
  - Navigating the inclusion-inflation trade-off was especially challenging
- Counterfactual policies would have shifted the burden across the distribution and over time
- **Next:** (i) welfare calculations, (ii) 'smarter' policies
- **Possibly**: Neural nets to achieve a FIRE global solution?