Informal Labor Markets in Times of Pandemic: Evidence from Latin America and Policy Options*

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* The views expressed here are those of the authors and do not necessarily reflect those of Banco de México or its Board of Governors. This project was sponsored by the Inter-American Development Bank. Leyva declares having worked for this project *ad honorem*.

Outline

- Mexico: A Tale of Two Recessions
  - The Role of Two Non-Conventional Margins
- Latin American Labor Markets during the Pandemic
  - The Unequal Burden of the Pandemic
- Structural Model
  - Setup of the Model
  - Calibration to Mexican data
  - Accounting for the pandemic recession
  - Simulating the recovery under different policies

Mexico: A Tale of Two Recessions

- Previous recessions in Mexico (2008-9) were characterized by:
  - Fall in employment
    - ... accounted for by a decline in labor force participation
    - ... together with an increase in unemployment
  - Sizable rise in the informality rate
    - ... driven by contraction in formal employment

- The onset of the 2020 pandemic recession looks different in some important dimensions:
  - Much larger drop in employment
    - ... almost entirely accounted for a decline in participation
    - ... with a minor role for unemployment
  - An unprecedented decline in the informality rate
    - ... driven by huge destruction of informal jobs

Mexico: Labor Market Indicators

(Working-age) population divided in four categories

- Employment (formal and informal)
- Unemployment
- Out of the labor force

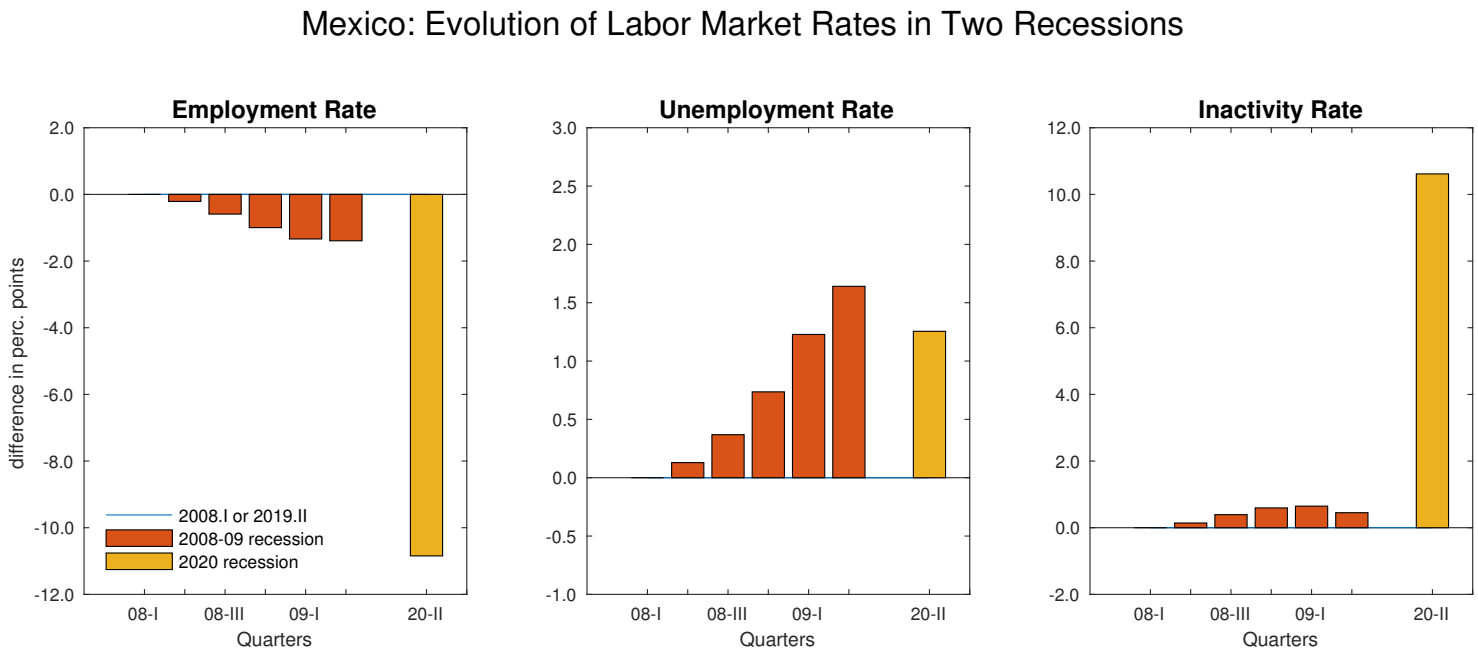
We calculate labor market indicators or rates

- Employment rate (over population)
- Inactivity rate (over population) = 1 - participation rate
- Unemployment rate (over the labor force)
- Informality rate (over total employment)

We also compute gross flows (transitions) across these categories

Data: ENOE (2005.Q1-2020.Q1), ETOE (2020.Q2)

Mexico: Evolution of Labor Market Indicators

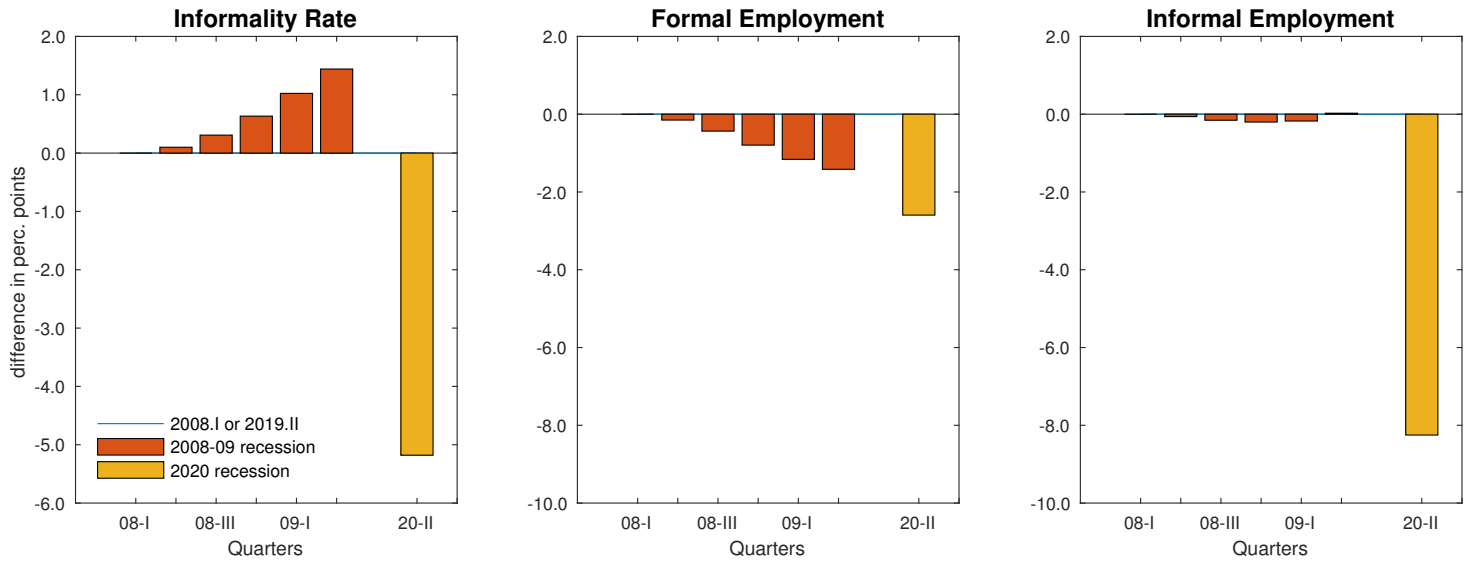


Comparing 2020.Q2 pandemic recession with 2008-9 recession

- Large fall in employment
  - ... mirrored by decline in participation rate
  - ... with small response of unemployment

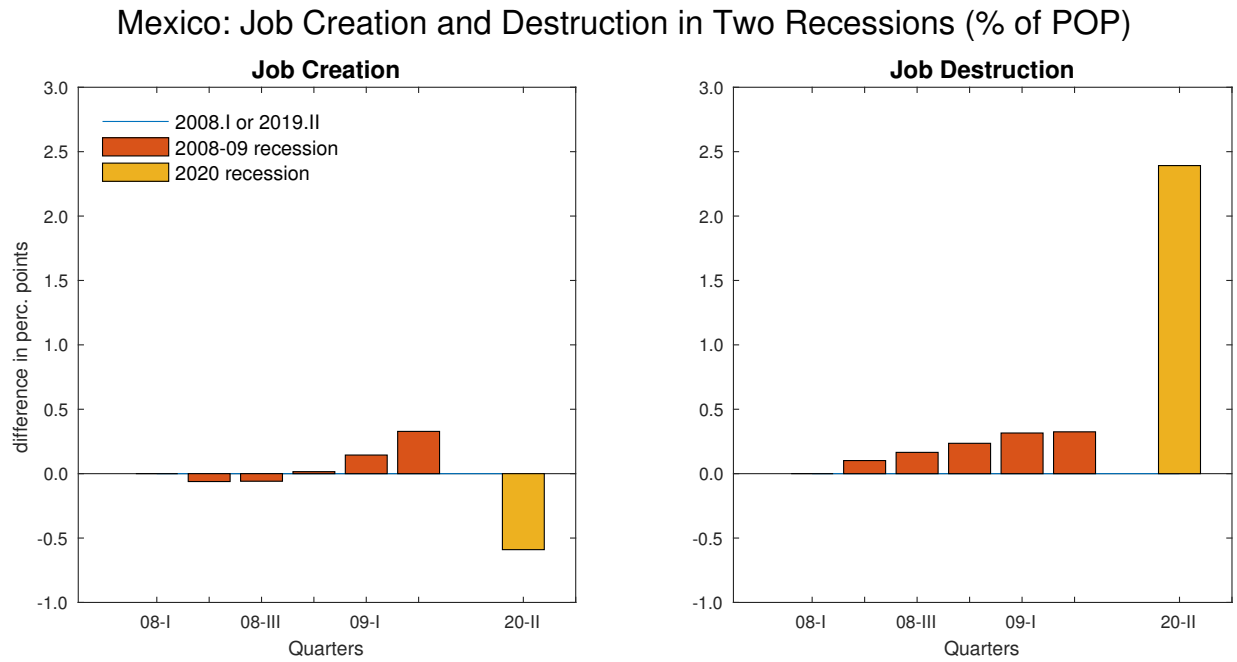
Mexico: Informal Employment and Informality Rate

Mexico: Evolution of Informality Rate in Two Recessions



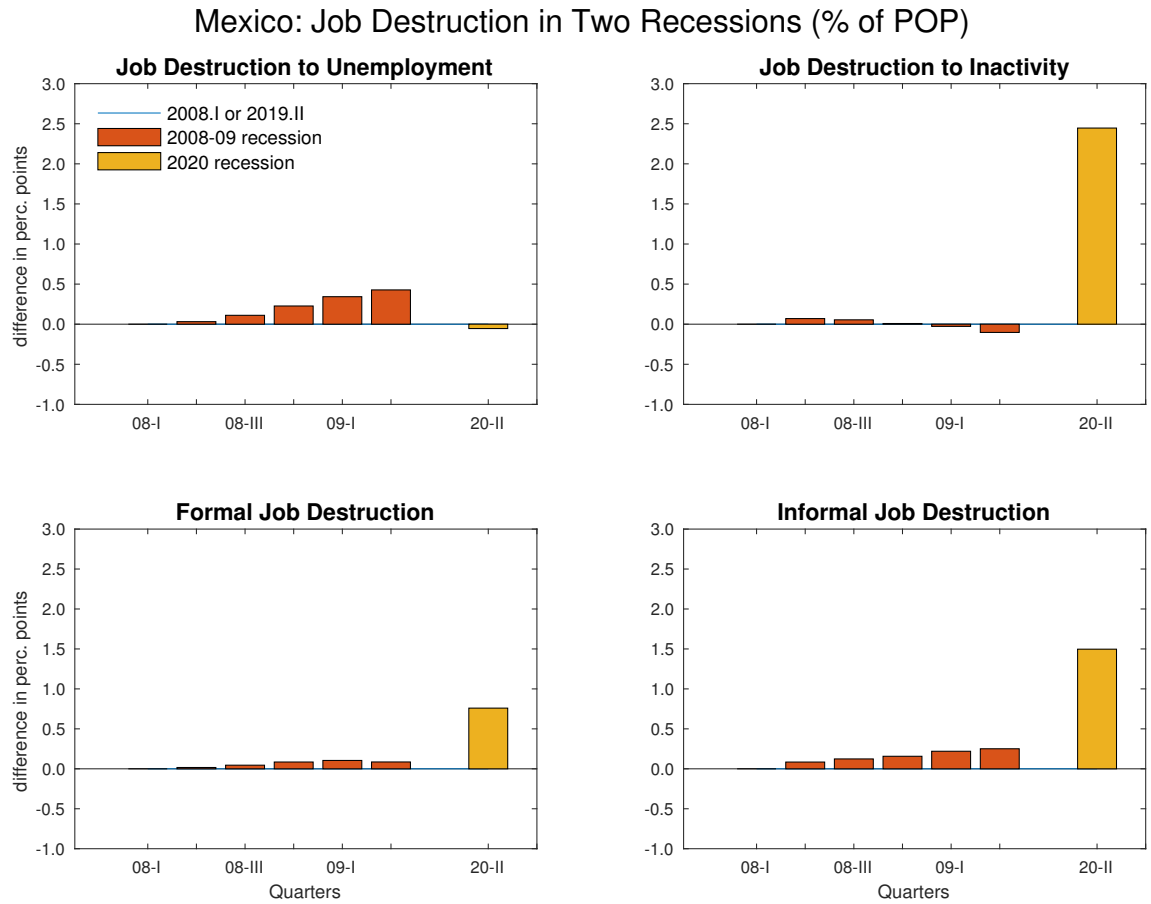
- Unprecedented decline in the informality rate
  - ... driven by a huge contraction of informal employment

Mexico: Job Creation and Job Destruction



- Employment contraction driven almost entirely by job destruction
  - ... more so than in the 2008-9 episode

Mexico: Job Destruction by Source and Outcome



- Job destruction to inactivity and from the informal sector the largest flows

Mexico: Two Non-Conventional Margins

	Overall Employment Rate, Perc. %		
	employment minus absent employees	baseline employment	employment plus temporary layoffs
	1	2	3
Great Recession	−2.3	−2.2	−2.4
Pandemic Recession	−29.7	−19.0	−6.7

- Temporary layoffs: non-employed with return date in less than 4 weeks, more than 4 weeks or uncertain
- Absent employees: employed who did not work at least for one hour during the reference survey week (close labor relationship, perceive earnings, expect to return during current week)
- These two categories are our own construction from the ENOE survey

Latin American Labor Markets during the Pandemic

- Assemble large dataset of labor market variables for five LA countries

	Brazil	Chile	Colombia	Mexico	Peru
Survey	PNAD-C	ENE	GEIH	ENOE	ENAHO
Start	2012.Q1	2010.M1	2007.M1	2005.Q1	2011.Q1
End	2020.Q2	2020.M6	2020.M6	2020.Q2	2020.Q2
Length	34 quarters	126 months	162 months	62 quarters	38 quarters

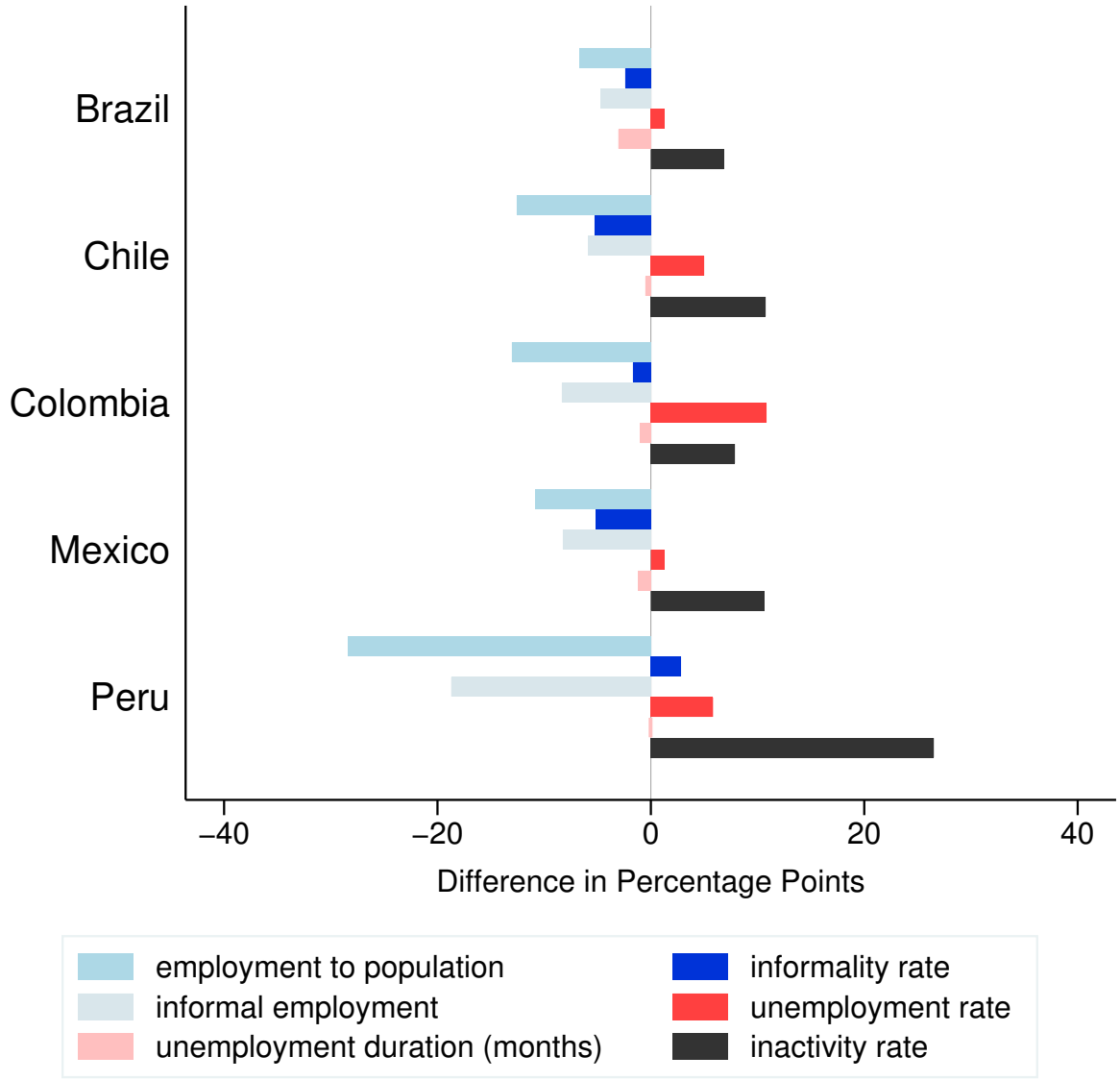
- Long time coverage and regional variation
- Broadest definition of informality (size, registration, access to health-care)
- Examine variation across population groups (gender and age)

Latin American Labor Markets during the Pandemic

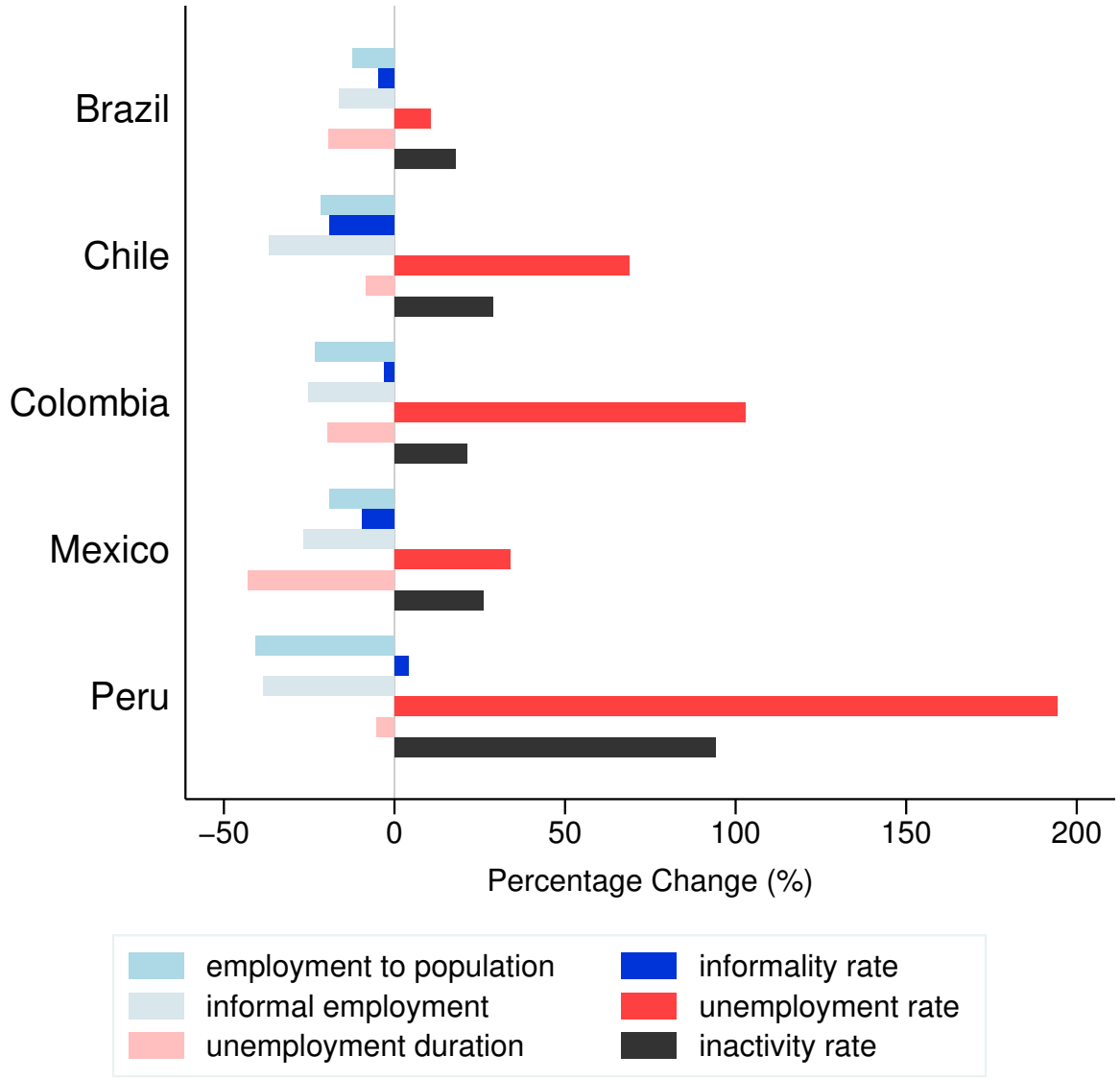
We confirm observed changes in key labor market indicators for Mexico

- Large drop in overall employment
  - Largely linked to huge declines in participation rates
  - Partially seen in higher unemployment rates
- Unprecedented informal job destruction
  - Informality rates decreasing at the outset of the pandemic
  - One exception: Peru

Latin American Labor Markets during the Pandemic



Latin American Labor Markets during the Pandemic

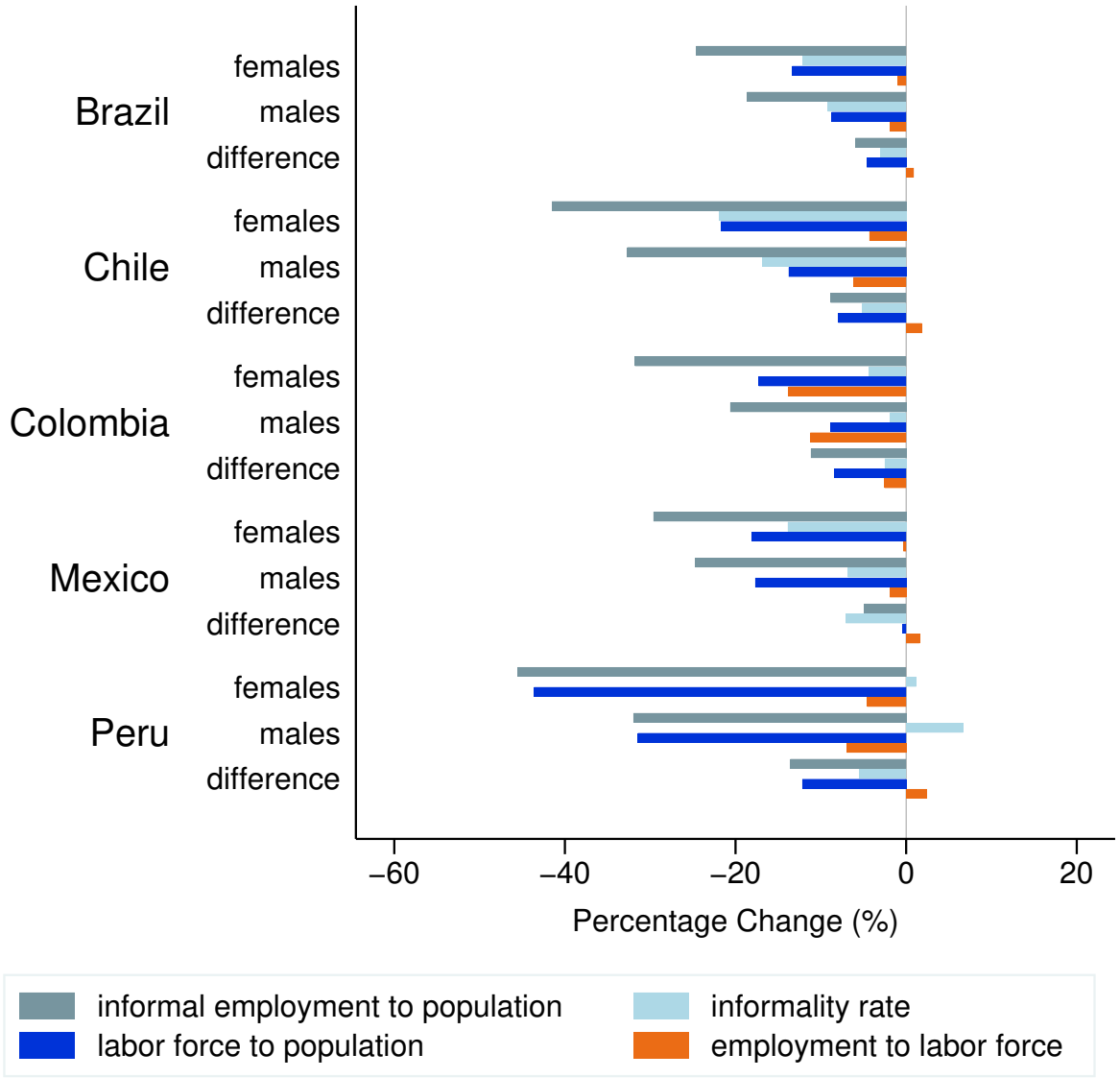


Latin America: The Unequal Burden of the Pandemic

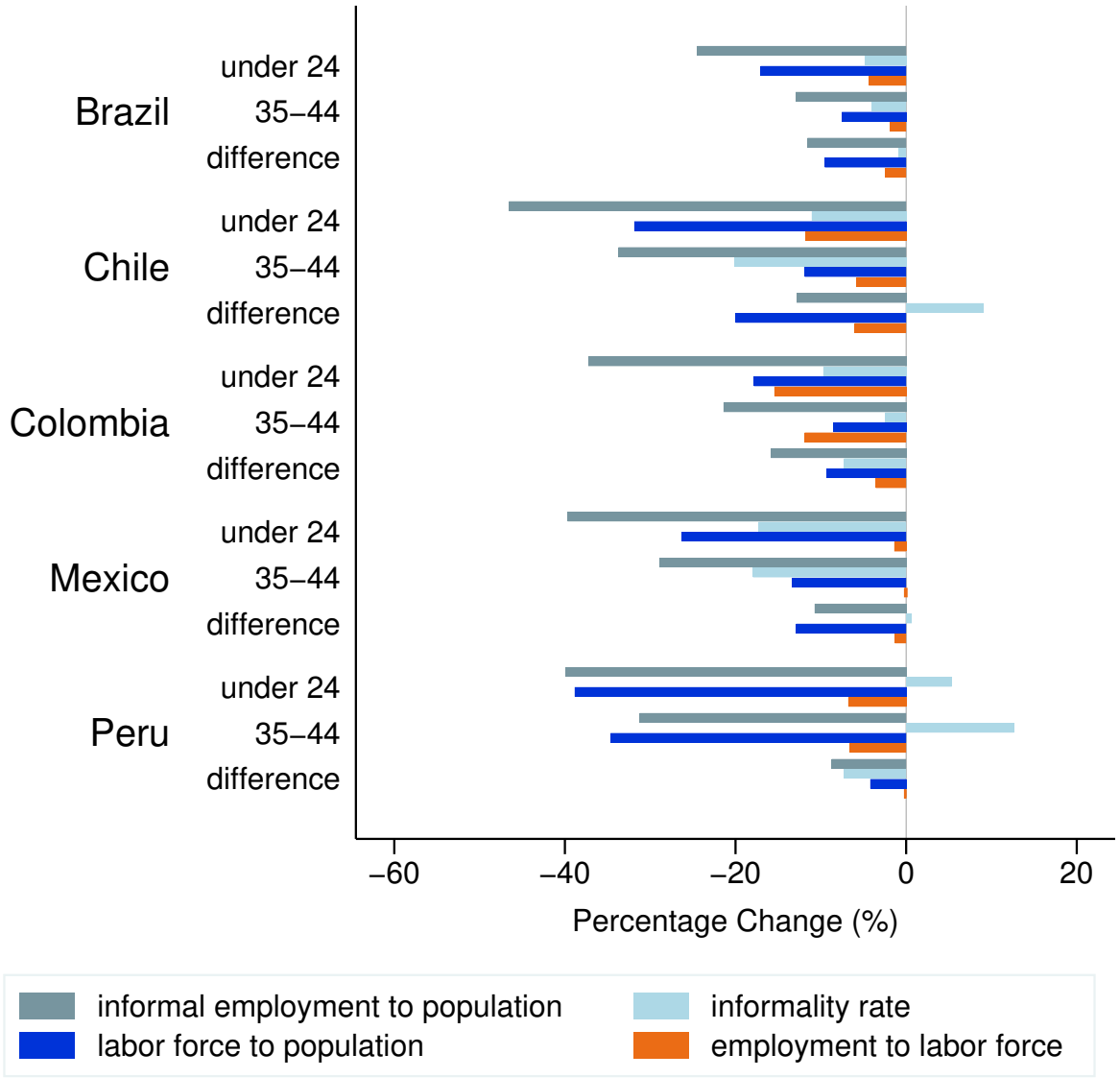
We also report labor market indicators by gender and age

- Larger fall in participation for females (relative to men) and young workers (relative to aged 35-44)
  - Job loss for young workers tilted towards formal employment
  - Job loss for females tilted towards informal employment
- The aggregate results do not just reflect a composition effect

Latin America: The Unequal Burden of the Pandemic



Latin America: The Unequal Burden of the Pandemic



A Model of Informal Labor Markets

Key ingredients of the model (based on Leyva and Urrutia, *JIE* 2020)

- Endogenous participation (leisure choice)
- Formal and informal (self-employed) sectors
- Matching frictions in the formal labor market
  - Unemployed workers search for jobs, firms post vacancies
  - Employment protection in the formal sector, modeled as firing cost
- Representative family (full insurance within household)
- Small open economy subject to technology and interest rate shocks

A Model of Informal Labor Markets: Technology

- Final good technology:

$$Y_t = A_t \left(K_t\right)^{\alpha} \left(M_t\right)^{1-\alpha}$$

  A_t: AR(1) aggregate technology shock

- Intermediate good is a composite of inputs produced in the formal sector and by informal (self-employed) workers

$$M_t = \left\{ \left(M_t^f\right)^{\frac{\epsilon-1}{\epsilon}} + \left(M_t^s\right)^{\frac{\epsilon-1}{\epsilon}} \right\}^{\frac{\epsilon}{\epsilon-1}}$$

  using linear deterministic technologies with productivities Ω and $\varkappa < \Omega$

- Aggregate production function for the economy:

$$\underbrace{Y_t}_{\text{GDP}} = \underbrace{\left[A_t \left\{ \left(\Omega\left(1-l_t^s\right)\right)^{\frac{\epsilon-1}{\epsilon}} + \left(\varkappa l_t^s\right)^{\frac{\epsilon-1}{\epsilon}} \right\}^{\frac{\epsilon(1-\alpha)}{\epsilon-1}} \right]}_{\text{TFP}} \left(K_t\right)^{\alpha} \left(L_t\right)^{1-\alpha}$$

A Model of Informal Labor Markets: Formal Employment

- Unemployed workers search for jobs, firms post vacancies
- Matching function implies vacancy filling probability:

$$q_t = \left(\frac{U_t}{V_t}\right)^{\phi}$$

- Law of motion of formal employment for *exogenous* separation rate s

$$L_t^f = (1-s)\, L_{t-1}^f + q_t V_t$$

- Value of a formal match for an entrepreneur

$$J_t = \left(p_t^{M,f}\Omega - (1+\tau)\, w_t\right) U_{c,t} + \beta E_t \left[(1-s)\, J_{t+1} - s\kappa U_{c,t+1}\right]$$

- Wages in the formal sector determined by Nash-Bargaining; zero profit condition for vacancy posting $q_t J_t = \eta U_{c,t}$ holds

A Model of Informal Labor Markets: Representative Household's Problem

- Time constraint:

$$\underbrace{L_t^f + L_t^s}_{\text{employed}} + \underbrace{U_t + O_t}_{\text{non-employed}} = 1$$

- Preferences:

$$E_0 \sum_{t=0}^{\infty} \beta^t \frac{\left[C_t - \varphi \frac{L_t^{1+\nu}}{1+\nu} - \frac{\varsigma}{2} U_t^2\right]^{1-\sigma}}{1-\sigma}$$

- Budget constraint:

$$C_t + I_t + (1 + r_t^*) B_t = \underbrace{w_t L_t^f + p_t^{M,s} \varkappa L_t^s}_{\text{labor income}} + r_t K_t + \underbrace{\kappa s L_{t-1}^f}_{\text{severance}} + B_{t+1} + \underbrace{\Pi_t}_{\text{transfers}}$$

- Interest rate:

$$(1 + r_t^*) = (1 + i_t^*) \Theta (B_t)$$

$\Theta (B_t)$: small endogenous risk-premium; i_t^*: AR(1) interest rate shock

Calibrating the Model

	Symbol	Value		Symbol	Value
From outside the model			*Calibrated to steady state targets*		
Risk Aversion Coefficient	σ	2	Disutility of Labor	φ	3.04
Discount Factor	β	0.99	Productivity Informal Sector	$\varkappa$	0.53
Depreciation Rate	δ	1.25%	Search Cost	ς	88.6
Elasticity of Matching Function	ϕ	0.40	Productivity Formal Sector	Ω	0.89
Payroll Tax	τ	0.25	Workers' Bargaining Power	γ	0.66
Separation Rate	s	8.57%	Capital Share in Pro. Function	α	0.23
Persistence AR(1)			Firing Cost	κ	1.39
Aggregate Productivity	ρ_A	0.90			
Persistence AR(1)					
Foreign Real Interest Rate	ρ_i	0.89			
Calibrated to business cycle targets					
S.D. Innovations AR(1)			S.D. Innovations AR(1)		
Aggregate Productivity	σ_A	0.70%	Foreign Interest Rate	σ_i	1.15%
Elasticity of Substitution between			Frisch Elasticity of Labor Supply	$1/\nu$	0.65
Formal and Informal Inputs	ϵ	2.82			
Adjustment Cost of Capital	ϑ	44.3	Cost of Posting a Vacancy	η	0.117

Calibrating the Model: Business Cycle Moments

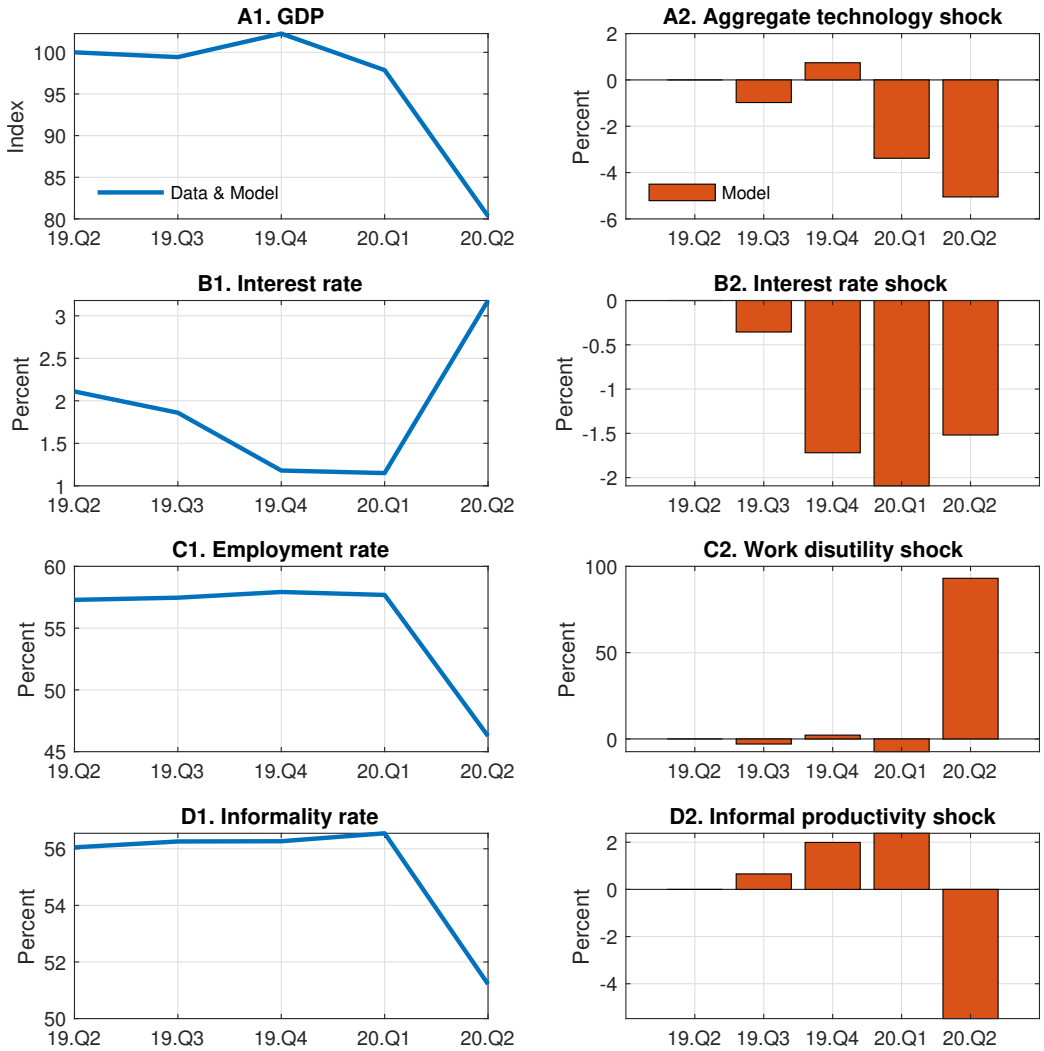
Relative Volatility	Data 1	Model 2	Correlation with Output	Data 3	Model 4
$\sigma(Y)$	1.35	1.35	-	-	-
$\sigma(C)/\sigma(Y)$	0.93	0.96	$Corr(C,Y)$	0.97	0.92
$\sigma(I)/\sigma(Y)$	2.33	2.33	$Corr(I,Y)$	0.87	0.91
$\sigma(L)/\sigma(Y)$	0.41	0.41	$Corr(L,Y)$	0.68	0.99
$\sigma(l^s)/\sigma(Y)$	0.53	0.53	$Corr(l^s,Y)$	-0.57	-0.38
$\sigma(1+i^*)$	0.49	0.49	$Corr(1+i^*,Y)$	-0.24	-0.24

- The model reproduces by construction the volatilities of output, investment, employment and the informality rate
  - ... and the volatility and counter-cyclicality of the foreign interest rate

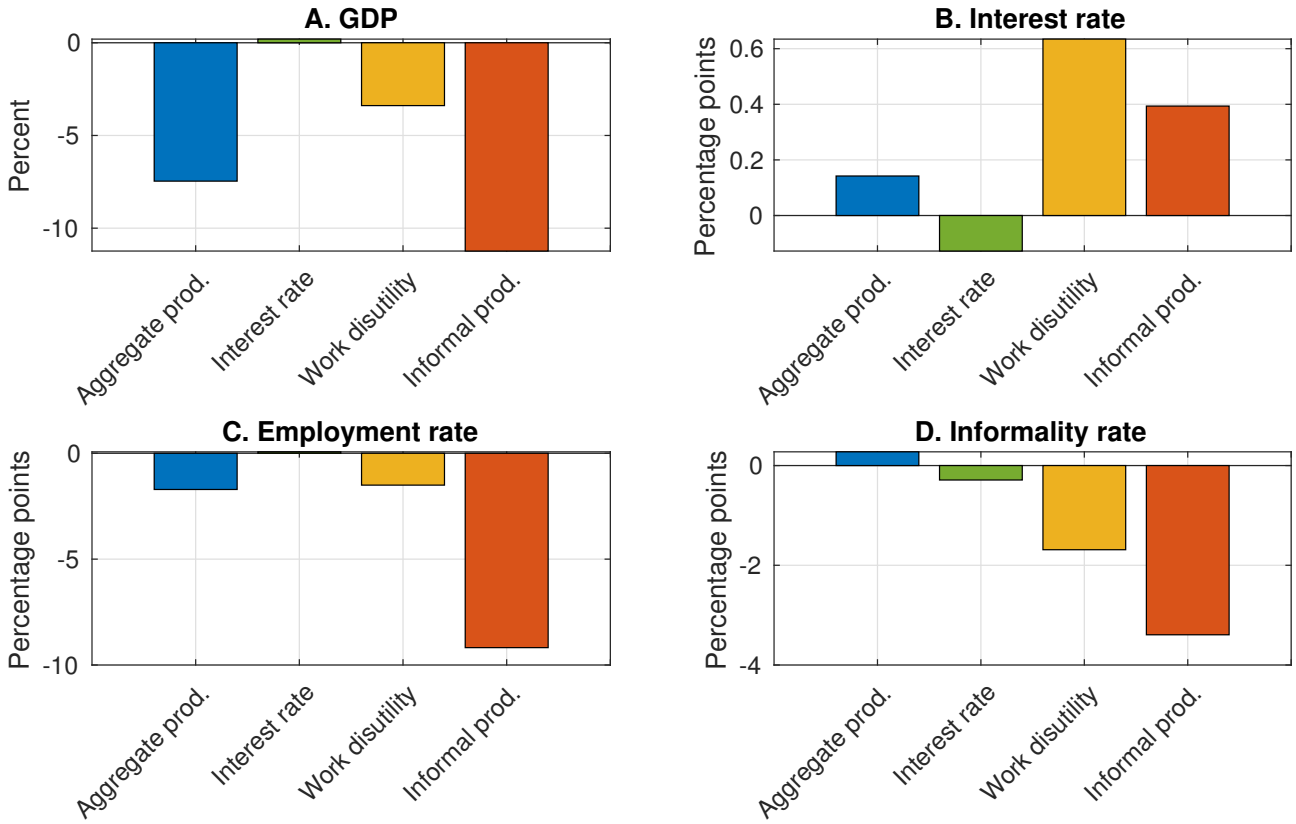
Accounting for the Pandemic Recession

- Extended model with two new AR(1) shocks
  - A shock to labor supply (disutility of work parameter φ_t)
  - A sector-specific productivity shock (informal productivity parameter χ_t)
- These shocks are reduced-form representations of the impact of COVID-19
  - Very small variance (quite infrequent) $\Longrightarrow$ do not affect calibration
  - Their persistence (ρ_{new}) reflects uncertainty about future evolution
- Accounting exercise: recover shocks that rationalize the behavior of GDP, interest rate, employment, and informality rate prior and during the pandemic recession (2020.Q2)

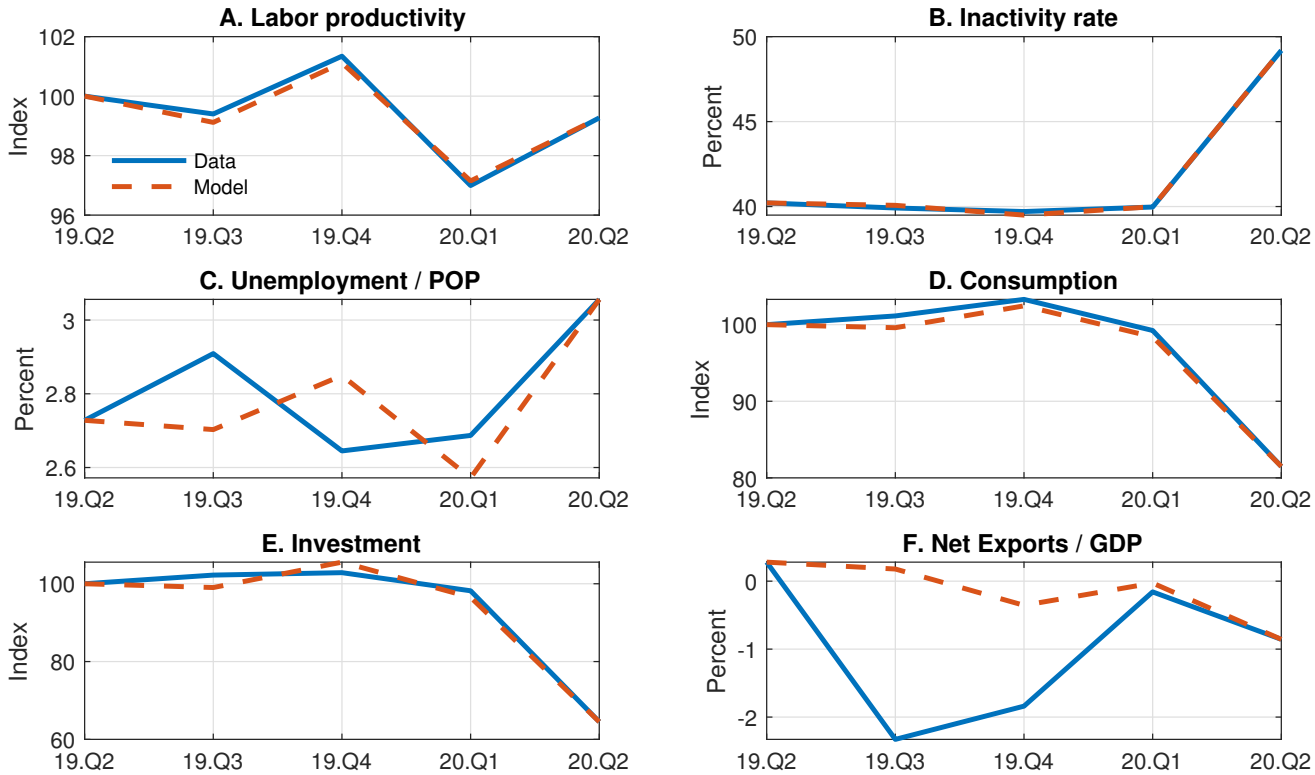
Accounting for the Pandemic Recession: Shocks Recovered



Accounting for the Pandemic Recession: Contribution of Each Shock



Accounting for the Pandemic Recession: Other Variables Fit

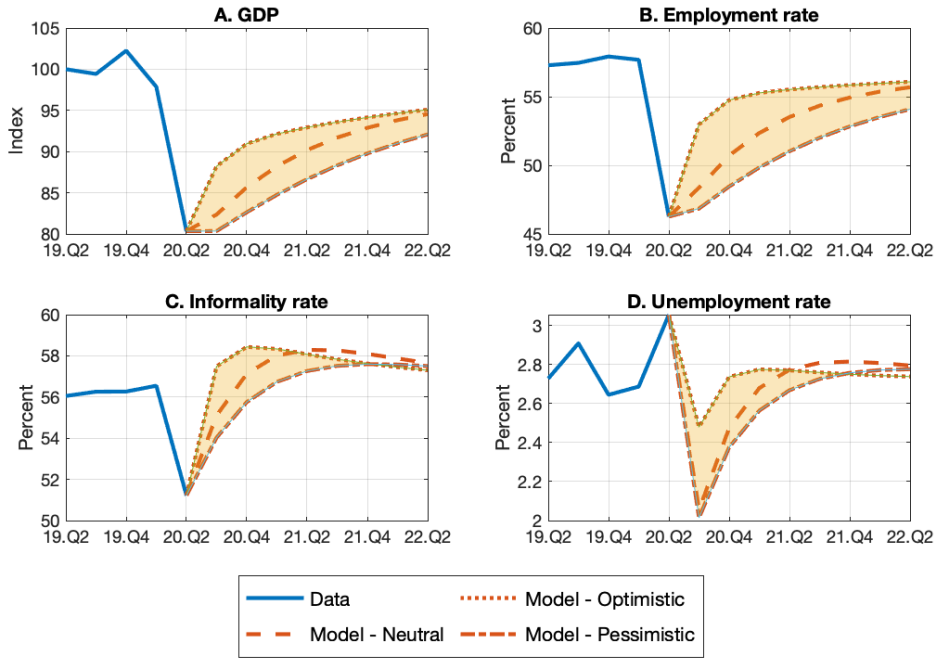


- Persistence of the two new shocks ($\rho_{\text{new}} = 0.65$) chosen as to reproduce the decline in net exports in 2020.Q2

Simulating the Recovery

- We simulate the recovery for the period 2020.Q3 to 2022.Q2 letting all shocks return to their average value
  - Different scenarios (optimistic, pessimistic) driven by the persistence parameter ρ_{new}
  - Our analysis does not touch upon medical constraints and containment policies (vaccine?)
- We will use the base scenario as a benchmark to analyze the impact of policy options

Simulating the Recovery: Different Scenarios



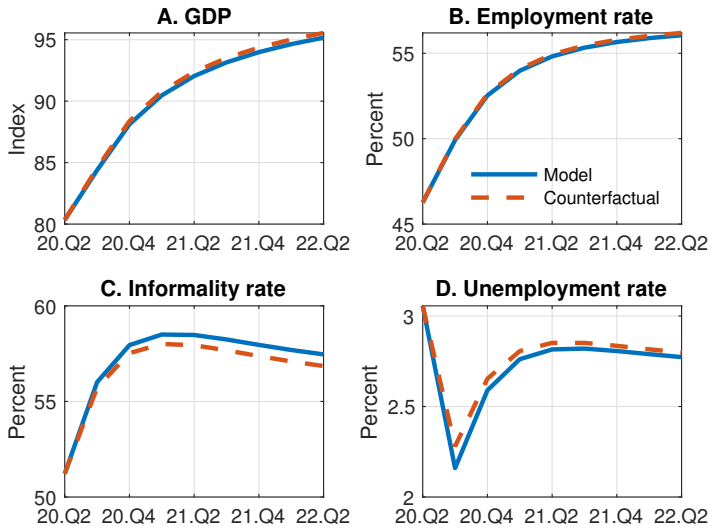
- Recovery led by the more flexible informal employment (similar to previous recessions)
  - Informality rate overshooting
  - This implies a decline in labor productivity, dragging the recovery

Policy Options

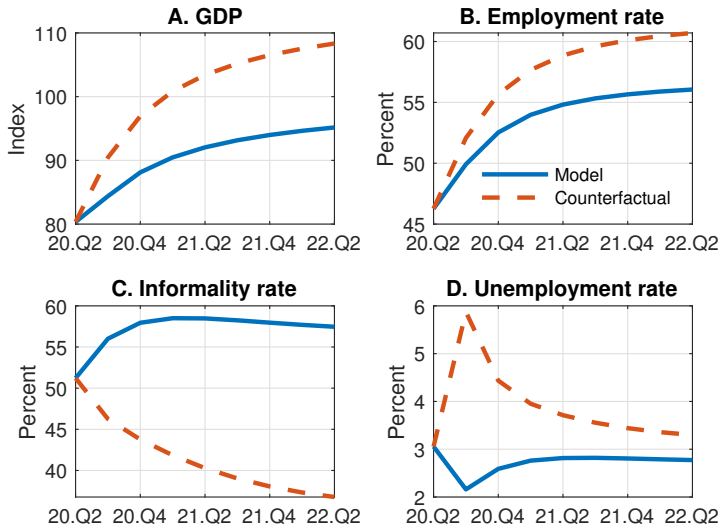
- We simulate the recovery under alternative policies
  - A payroll tax cut
  - A hiring subsidy (to vacancy posting)
  - Unemployment benefits
  - Informal income subsidy
- All policies are unanticipated and last only for two years
- The size of each policy is normalized to cost 0.5% of GDP per period

Policy Options: Payroll Tax Cut and Hiring Subsidy

Payroll Tax Cut



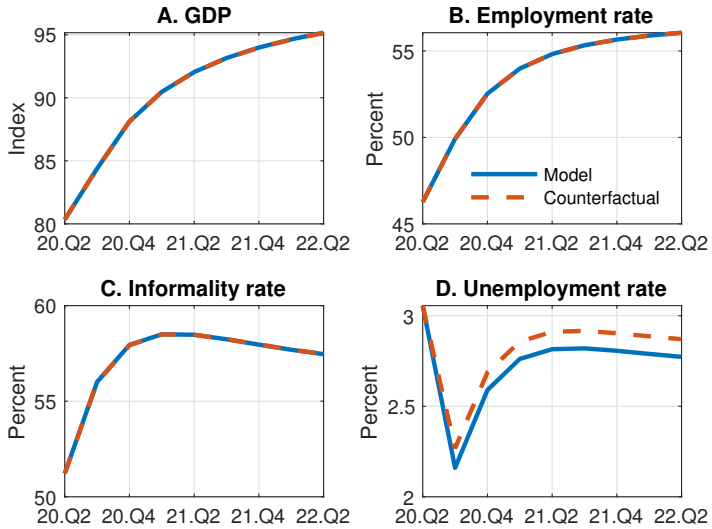
Hiring Subsidy



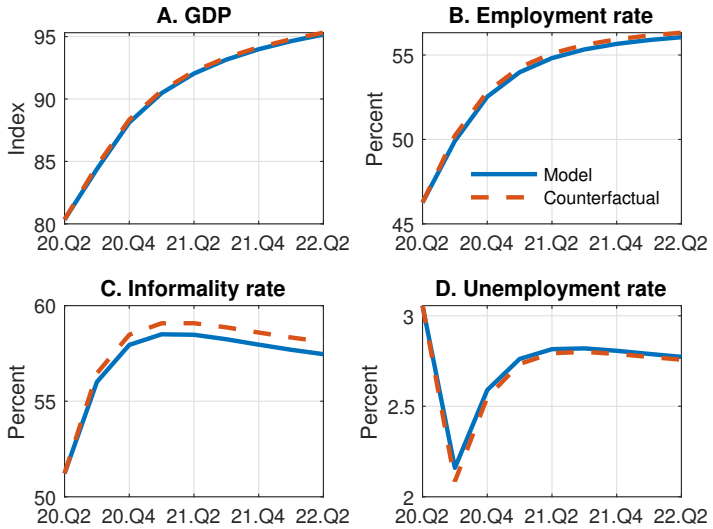
- Incentivize formal job creation, employment and labor productivity, dampening informality rate
- Tax cut too expensive; hiring subsidy better targeted at new formal matches, hence bigger effects

Policy Options: Unemployment Benefits and Informal Income Subsidy

Unemployment Benefits



Informal Income Subsidy

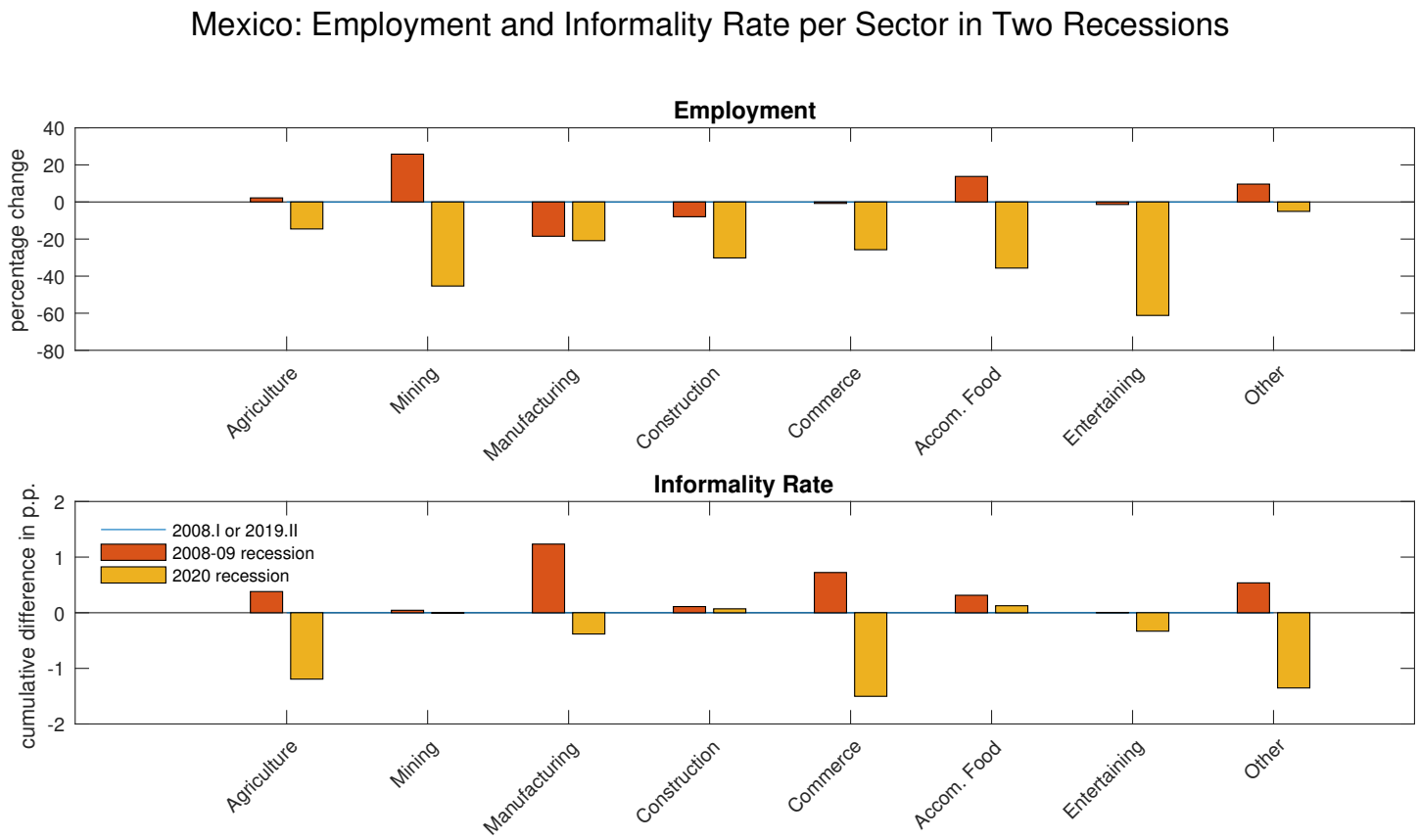


- UB only increase unemployment; more people search but weak labor demand
- Informality subsidy does incentivize employment, but boosting informality rate; it is also expensive

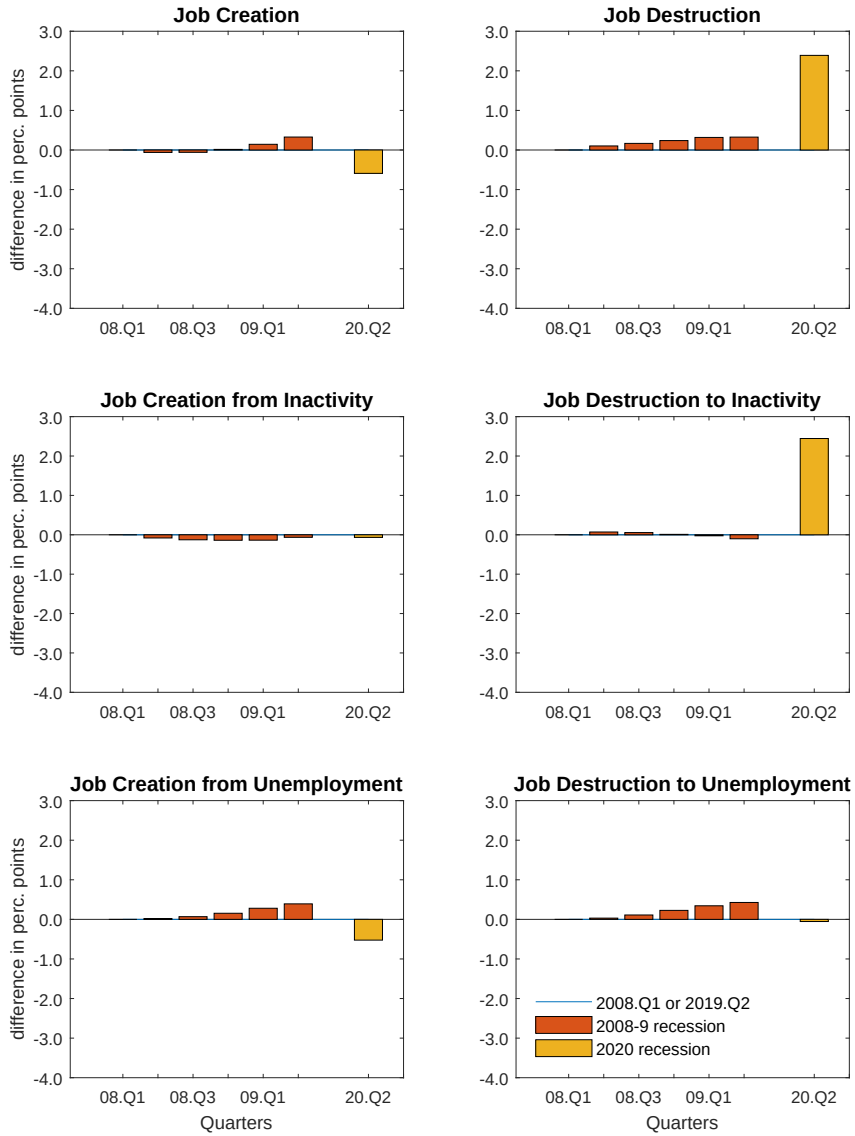
A Few Final Caveats

- Our framework does not allow for a feedback from policies to the pandemic itself
  - Would require an epidemiological model
- The model ignores distributional issues
  - Representative household, perfect risk-sharing
  - No role for income protection of poor households
  - Would require heterogeneous-agents framework (with incomplete markets)
- Separations in the model are exogenous
  - No role for policies protecting existing formal jobs
  - Would require model of heterogeneous firms

Mexico: Labor Market Indicators by Sector



Mexico: Job Creation and Destruction by Type of Non-Employment



Mexico: Job Creation and Destruction by Type of Employment