Supplementary Materials: Competition Pressure, Work Hours and Welfare Valuation in a China-Calibrated Agent-Based Macroeconomic Model

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Supplementary Section S1. Reproducible CFPS measurement

The authors obtained registered and authorized access to the CFPS 2016 and 2022 microdata. The work-hours extraction resolves qg6, qg11 and qg12 by an exact wave-specific priority map before applying any restriction. The analytic sample is age 16–65, employed, a wage worker, and has current-main-job weekly hours in $(0, 112]$. Weighted statistics use only a positive person cross-sectional weight. Missing or non-positive weights are counted and excluded rather than imputed. The analysis neither identifies nor reports locations below the provincial level, consistent with the CFPS restricted-data guidance (https://www.isss.pku.edu.cn/cfps/en/data/restricted/index.htm).

Table S1. CFPS analytic sample counts and eligibility for person weighting.

Wave	Restricted sample	Positive-weight sample	Weight-ineligible
2016	5,234	4,461	773
2022	8,235	6,994	1,241

The conditional 95% intervals use deterministic multiplier weights applied to the supplied person weights. They are suitable for showing uncertainty under that weighting scheme but are not full survey-design intervals because the calculation does not include strata or primary sampling units. The reproducibility checks record the licensed raw-file hashes, extraction-script hash, derived-table hashes, sample flow and an exact second execution. Access authorization is not treated as redistribution permission: no raw or derived row-level CFPS data enter the public replication package.

Supplementary Section S2. Empirical schedule construction

The initial parametric preference calibration could not reproduce the 2016 median, P90 and long-hours shares simultaneously. A declared two-type alternative also did not meet those distributional criteria. The reported schedule representation uses the weighted qg6 distribution with 12 probability bins. Values at 20 and 80 reflect model bounds; interior bins use either their conditional weighted mean or a target- preserving value. The aggregate-only file has SHA-256 `45d7ed1f3b8c0ee984e23520425d9e0e255c7241ac6ef157afdc643eb5184c7f`.

For N agents with CDF F_A, systematic inverse-CDF sampling draws

$$A_h = F_A^{-1}(U/N + (h-1)/N), \qquad U \sim \mathcal{U}(0,1),$$

and then randomly permutes the anchors. The same algorithm is used in every reported anchored simulation cell. At zero pressure, target hours equal A_h; pressure adds the difference between the pressured and zero-pressure utility optima. This identity was verified during schedule calibration. Seventeen of 20 held-out simulation seeds met all aggregate tolerances, exceeding the declared 80% threshold, and three independent reproductions matched all expected hashes.

Supplementary Section S3. Labour normalization and loan-price safeguards

Macro-fiscal validation showed that dividing anchored schedules by a common 40-hour denominator made the zero-pressure worker supply about 1.3 baseline labour units. The primary specification instead uses

$$e_h = H_h / A_h, \qquad Y_h^L = \bar{w}_h H_h / A_h,$$

so $H_h = A_h$ preserves one labour and wage unit. Validation also identified a second problem: the risk-pricing leverage ratio divided debt by nearly zero net worth, creating a loan rate large enough to turn a small loan principal into enormous bank interest and dividends. The correction caps leverage at ten only inside the loan-price formula. Credit approval, balance-sheet debt, default and loss-given-default remain based on the uncapped firm state. Both corrections were applied before generating the reported simulation results.

Table S2. Baseline calibration and structural checks

Moment	Target	Model mean	95% seed interval	Gap
Household consumption/GDP	0.364	0.342	[0.339, 0.344]	-0.022
Labour income/GDP	0.514	0.513	[0.511, 0.514]	-0.001
Non-positive wage-income share	0.279	0.280	[0.270, 0.290]	+0.001
Positive wage-income Gini	0.464	0.444	[0.439, 0.449]	-0.020
Government debt/annual GDP	0.375	0.365	[0.362, 0.368]	-0.010
Household income Gini	0.528	0.485	[0.481, 0.489]	-0.043
Mean weekly hours	52.96	52.06	[51.93, 52.20]	-0.89
Median weekly hours	54.00	52.37	[52.06, 52.68]	-1.63
P90 weekly hours	77.00	74.05	[73.50, 74.59]	-2.95
Share above 44 hours	0.684	0.684	[0.680, 0.687]	-0.000
Share above 60 hours	0.285	0.284	[0.281, 0.287]	-0.001

Notes: Values are post-burn-in means over 30 held-out simulation seeds. The income Gini is a held-out baseline check; all other displayed macro and hours moments are declared targets or preservation checks. Every displayed eligible moment met its declared tolerance.

Table S3. No-re-estimation temporal comparison with CFPS 2022

Moment	2022 data	Model	Model minus data
Mean	51.36	52.05	+0.68 h
P10	35.00	30.69	-4.31 h
P25	40.00	40.08	+0.08 h
Median	50.00	52.25	+2.25 h
P75	60.00	63.47	+3.47 h
P90	70.00	74.36	+4.36 h
Share $>$ 40	68.5	71.9	+3.4 pp
Share $>$ 44	65.8	68.3	+2.6 pp
Share $>$ 60	23.5	28.3	+4.8 pp

Notes: Gaps use unrounded estimates. The 2016 anchor and macro-fiscal parameters are unchanged. We report discrepancies in hours and percentage points rather than classifying every moment by interval overlap. Archived data intervals use conditional multiplier weights; model intervals use 30 simulation seeds. Neither supplies joint survey-design, parameter and structural uncertainty. Narrow model intervals measure numerical precision, not predictive validity. This descriptive comparison has no fit threshold.

Supplementary Section S4. ODD model description

Model lineage. The sectoral backbone extends the AB–SFC benchmark of Caiani et al. (2016, *Journal of Economic Dynamics and Control*, 69, 375–408, https://doi.org/10.1016/j.jedc.2016.06.001). It retains the C/K-firm partition and the household–firm–bank–government–central-bank transaction network. The present model reparameterizes that backbone with an author-constructed 2017 China SAM and quarterly timing and adds the CFPS-anchored pressure–hours block, the weak-demand and market-share competition experiments, an external-demand account, competitive expenditure, and non-market-time welfare.

Purpose. The model asks whether market-share competition under a common weak-demand shock changes work hours and whether valuing non-market time changes the welfare assessment. Primary patterns are the CFPS work-hours distribution, household consumption, labour income, wage participation, income inequality and public debt.

Entities and scales. A central run contains 300 households, 60 consumption firms, 20 capital-goods firms, four banks, a government and a central bank. Households hold deposits and housing wealth; firms hold deposits, inventories, physical and quality capital, loans, productivity and profit histories; banks hold loans, bonds, reserves, deposits, central-bank funding and equity. One period is a quarter and each run lasts 80 quarters, with the first 40 discarded.

Process schedule. Each quarter updates household expectations and income gaps; firm demand, price and investment plans; labour separation and matching; hours; credit; production and goods markets; household, firm, bank and fiscal settlement; default and replacement; and accounting diagnostics. Goods and labour are short-side rationed. Stochasticity enters household initialization, firm and bank heterogeneity, matching and replacement.

Inputs. Annual real-sector flows come from the author-constructed 2017 SAM documented in Supplementary Section S7 and are divided by four. Financial stocks use explicit annual-GDP ratios. The macro-fiscal parameter vector, hours-anchor distribution, scenario definitions, seed assignments and global sensitivity design are separate hash-identified inputs. The generic pressure utility weight equals one, so the sensitivity inputs are the effective coefficients θ_G and θ_F.

Accounting. Every quarter records

$$g_D = \sum_h D_h + \sum_i D_i - \sum_b D_b, \qquad g_L = \sum_i L_i - \sum_b L_b,$$
$$g_B = B_G - \sum_b B_b, \qquad g_{\text{bank}} = \sum_b (L_b + B_b + R_b - D_b - A_{cb,b} - E_b).$$

The run-level acceptance criterion is the maximum absolute residual over time and these identities below 10^{-3}. The largest residual in the reported simulations is 9.31e-10.

S4.1. Transaction-flow and balance-sheet matrices

The four identities above are the operational SFC acceptance gates. They are narrower than a complete national-accounts closure: exports enter the consumption-firm revenue block through an external-demand account, imports enter aggregate GDP as a calibrated leakage, and neither item is settled through an external financial-stock ledger. Table S4 therefore reports the quarterly TFM as an implemented *counterpart map*. Receipts and increases in liabilities are positive; payments and acquisitions of assets are negative. Every transaction row sums to zero. The sector-account balance z_s closes each column and is carried to stocks; it is a diagnostic balancing item rather than an additional simulated payment. A zero means that no separate counterpart is recorded in that sector, not that the corresponding empirical flow must be zero.

Table S4. Quarterly transaction-flow matrix (implemented counterpart map).

Transaction	Households	C-firms	K-firms	Banks	Government	Central bank	External demand	Σ
Household consumption	$-C_H$	$+C_H$	0	0	0	0	0	0
Government consumption	0	$+G_C$	0	0	$-G_C$	0	0	0
Exports	0	$+X$	0	0	0	0	$-X$	0
Private capital goods	0	$-I_C$	$+I_C$	0	0	0	0	0
Public capital goods	0	0	$+I_G$	0	$-I_G$	0	0	0
Wages	$+(W_C + W_K)$	$-W_C$	$-W_K$	0	0	0	0	0
Labour taxes	$-T_L$	0	0	0	$+T_L$	0	0	0
Firm and carbon taxes	0	$-T_C$	$-T_K$	0	$+(T_C + T_K)$	0	0	0
Transfers and benefits	$+TR$	0	0	0	$-TR$	0	0	0
Fiscal-booked producer support	0	$+S_C^G$	$+S_K^G$	0	$-(S_C^G + S_K^G)$	0	0	0
Household deposit interest	$+r_D D_H$	0	0	$-r_D D_H$	0	0	0	0
Loan interest	0	$-r_C L_C$	$-r_K L_K$	$+(r_C L_C + r_K L_K)$	0	0	0	0
Government-bond interest	0	0	0	$+r_B B_B$	$-r_B B_G$	0	0	0
Central-bank funding interest	0	0	0	$-r_{cb} A_{cb}$	0	$+r_{cb} A_{cb}$	0	0
Dividends (accrual aligned)	$+(Div_C + Div_K + Div_B)$	$-Div_C$	$-Div_K$	$-Div_B$	0	0	0	0
Change in deposits	$-\Delta D_H$	$-\Delta D_C$	$-\Delta D_K$	$+\Delta D_B$	0	0	0	0
Net change in firm loans	0	$+\Delta L_C$	$+\Delta L_K$	$-\Delta L_B$	0	0	0	0
Change in government bonds	0	0	0	$-\Delta B_B$	$+\Delta B_G$	0	0	0
Change in reserves	0	0	0	$-\Delta R_B$	0	$+\Delta R_{cb}$	0	0
Change in central-bank funding	0	0	0	$+\Delta A_{cb,B}$	0	$-\Delta A_{cb,CB}$	0	0
Sector-account balance	z_H	z_C	z_K	z_B	z_G	z_{CB}	z_X	0
Column sum	0	0	0	0	0	0	0	0

Here ΔL_s is net of scheduled repayment and default write-offs. The deposit, loan and bond rows obey $\Delta D_B = \Delta D_H + \Delta D_C + \Delta D_K$, $\Delta L_B = \Delta L_C + \Delta L_K$ and $\Delta B_B = \Delta B_G$ at the quarterly reconciliation. Reserves and central-bank funding are then the residual instruments used to satisfy the bank balance sheet. Firm and bank dividends are deducted when declared and enter household resources with a one-quarter lag; Table S4 aligns that row on an accrual basis. Purchases by capital-goods firms from other capital-goods firms net within the aggregated K-firm column. Policy bonuses that are not charged to the fiscal settlement, bank-capital-floor recapitalization, and the import leakage are outside the current-flow counterpart audit; this is why the four displayed stock identities, rather than every TFM column, constitute the run-level acceptance gate.

Table S5 records the implemented end-of-quarter BSM. Financial claims cancel under consolidation when the four gates hold. Housing wealth and firms' productive capital remain as consolidated non-financial assets. Sector net worth is shown with a negative sign on the financing side so that every sector column sums to zero.

Table S5. End-of-quarter balance-sheet matrix (implemented stocks).

Instrument	Households	C-firms	K-firms	Banks	Government	Central bank	Consolidated
Housing wealth	$+H_W$	0	0	0	0	0	$+H_W$
Productive capital	0	$+p_K K_C$	$+p_K K_K$	0	0	0	$+p_K(K_C + K_K)$
Deposits	$+D_H$	$+D_C$	$+D_K$	$-D_B$	0	0	0
Firm loans	0	$-L_C$	$-L_K$	$+L_B$	0	0	0
Government bonds	0	0	0	$+B_B$	$-B_G$	0	0
Reserves	0	0	0	$+R_B$	0	$-R_{cb}$	0
Central-bank funding	0	0	0	$-A_{cb,B}$	0	$+A_{cb,CB}$	0
Net worth / equity	$-V_H$	$-V_C$	$-V_K$	$-E_B$	$-V_G$	$-V_{CB}$	$-V_\Sigma$
Column sum	0	0	0	0	0	0	0

The balancing definitions are $V_H = H_W + D_H$, $V_s = p_K K_s + D_s - L_s$ for $s \in \{C, K\}$, $E_B = L_B + B_B + R_B - D_B - A_{cb,B}$, $V_G = -B_G$, $V_{CB} = A_{cb,CB} - R_{cb}$ and $V_\Sigma = H_W + p_K(K_C + K_K)$. Quality capital, inventories and productivity histories are behavioural states but are not included in the implemented financial-net-worth identity. A government deposit may be initialized as a state variable, but it is not included in the quarterly bank-reconciliation or acceptance equations and is therefore omitted from Table S5.

Supplementary Section S5. Global sensitivity design and complete paired comparisons

The main design crosses the fixed-40-hour benchmark, anchored/no-pressure and full-model ablations with baseline, demand-only and demand-plus-competition scenarios. All nine cells use seeds 14501–14530. The global design uses an 80-point Latin hypercube with one unique seed per draw and four common-seed cells per draw. The ranges are $\theta_G \in [0.10, 0.40]$, $\theta_F \in [0.25, 0.85]$, $\omega_L \in [0.15, 0.55]$, $T \in [104, 120]$ and $\lambda_H \in [0.20, 0.50]$. Twenty draws use each declared productivity/pay mapping. This region contains only positive pressure loadings; its sign retention does not test zero or negative responses. The one-seed-per-draw design combines parameter and Monte Carlo variation. The specified decision rule for a sign claim requires at least 80% retention and a Wilson 95% lower bound of at least 75%, which requires 68 of 80 draws. These fractions describe the sampled design, not the probability of a real-world effect. The archived designs are not described as externally preregistered; the subsequent χ analysis is exploratory.

Table S6. Main 3-by-3 mechanism experiment: post-burn-in cell means

Ablation	Scenario	Mean hours	P90 hours	Share > 60	Real GDP	W^C	W^T
Fixed-40-hour benchmark	Baseline	40.00	40.00	0.0%	201.86	-0.138	-0.095
Fixed-40-hour benchmark	Demand shock	40.00	40.00	0.0%	201.37	-0.139	-0.096
Fixed-40-hour benchmark	Demand + competition	40.00	40.00	0.0%	211.38	-0.127	-0.087
Anchored hours, no pressure	Baseline	52.13	74.81	28.5%	199.21	-0.144	-0.155
Anchored hours, no pressure	Demand shock	52.18	74.75	28.6%	199.01	-0.144	-0.155
Anchored hours, no pressure	Demand + competition	52.10	74.63	28.7%	206.34	-0.136	-0.151
Full model	Baseline	55.58	79.34	41.2%	230.56	-0.106	-0.152
Full model	Demand shock	55.62	79.34	41.3%	229.54	-0.108	-0.153
Full model	Demand + competition	65.85	79.96	69.1%	164.93	-0.277	-0.266

Notes: Thirty common random seeds per cell. W^C is the benchmark consumption-only index; W^T adds the value of non-market time. Cell means are descriptive; inference uses within-seed contrasts in Table S7.

Table S7. Archived central contrasts in their original units

Contrast	Mean	95% MC interval	Signs +/0/−
Pressure raises hours under competition (hours)	13.75	[13.32, 14.18]	30/0/0
Competition amplification (hours, difference-in-differences)	10.30	[9.90, 10.71]	30/0/0
Welfare attenuation $A(0.5)$ (index units; expected negative)	0.0564	[0.0531, 0.0597]	30/0/0

Notes: Intervals describe Monte Carlo uncertainty over 30 common seeds, conditional on fixed inputs and model structure. The third contrast is $(W_C^T - W_D^T) - (W_C^C - W_D^C)$ within the full model, where C and D denote demand plus competition and demand only. A negative sign was hypothesized; the estimated contrast is positive. Archived significance tests are not used as evidence of substantive importance or empirical validity.

Table S8. Global sensitivity sign-retention results

Claim	Retained	Rate	Wilson lower	Required	Criterion
Pressure raises hours	80/80	100.0%	95.4%	68/80; 75%	Met
Competition amplification	80/80	100.0%	95.4%	68/80; 75%	Met
Declared welfare contrast (< 0)	0/80	0.0%	0.0%	68/80; 75%	Not met

Notes: Eighty Latin-hypercube draws vary both effective pressure coefficients, the non-market-time weight, the time endowment and adjustment speed. Four productivity/pay mappings receive 20 draws each. Claim 3 is retained only when $(W_C^T - W_D^T) - (W_C^C - W_D^C) < 0$. A zero or incomplete four-cell draw counts against sign retention.

Table S9. Complete declared paired comparisons for primary and secondary outcomes

Outcome	Comparison	Scenario/ablation	Mean	95% MC interval
aggregate involution extended	Competition − demand (full)	Full model	+0.18075	[+0.17543, +0.18608]
aggregate involution extended	Full − no pressure	Baseline	+0.016811	[+0.0072154, +0.026407]
aggregate involution extended	Full − no pressure	Demand + competition	+0.067677	[+0.060868, +0.074485]
aggregate involution extended	Full − no pressure	Demand only	+0.02111	[+0.013036, +0.029185]
aggregate involution extended	Pressure-channel DiD	Competition vs demand	+0.046566	[+0.040781, +0.052351]
average weekly hours	Competition − demand (full)	Full model	+10.225	[+9.8226, +10.628]
average weekly hours	Full − no pressure	Baseline	+3.4517	[+3.2832, +3.6202]
average weekly hours	Full − no pressure	Demand + competition	+13.749	[+13.315, +14.184]
average weekly hours	Full − no pressure	Demand only	+3.4445	[+3.2554, +3.6336]
average weekly hours	Pressure-channel DiD	Competition vs demand	+10.305	[+9.9046, +10.705]
excessive hours share 44	Competition − demand (full)	Full model	+0.1433	[+0.13666, +0.14993]
excessive hours share 44	Full − no pressure	Baseline	+0.071229	[+0.066331, +0.076127]
excessive hours share 44	Full − no pressure	Demand + competition	+0.21712	[+0.2088, +0.22543]
excessive hours share 44	Full − no pressure	Demand only	+0.070734	[+0.064086, +0.077382]
excessive hours share 44	Pressure-channel DiD	Competition vs demand	+0.14638	[+0.13896, +0.1538]
excessive hours share 60	Competition − demand (full)	Full model	+0.27817	[+0.26384, +0.29251]
excessive hours share 60	Full − no pressure	Baseline	+0.12684	[+0.12011, +0.13357]
excessive hours share 60	Full − no pressure	Demand + competition	+0.404	[+0.38944, +0.41856]
excessive hours share 60	Full − no pressure	Demand only	+0.12712	[+0.11962, +0.13462]
excessive hours share 60	Pressure-channel DiD	Competition vs demand	+0.27688	[+0.26248, +0.29128]
government debt to annualized gdp	Competition − demand (full)	Full model	+0.45412	[+0.40744, +0.50079]
government debt to annualized gdp	Full − no pressure	Baseline	-0.015685	[-0.019276, -0.012094]
government debt to annualized gdp	Full − no pressure	Demand + competition	+0.44048	[+0.39329, +0.48767]
government debt to annualized gdp	Full − no pressure	Demand only	-0.015906	[-0.019761, -0.012051]
government debt to annualized gdp	Pressure-channel DiD	Competition vs demand	+0.45639	[+0.40975, +0.50302]
household consumption rate	Competition − demand (full)	Full model	-0.054138	[-0.05958, -0.048695]
household consumption rate	Full − no pressure	Baseline	+0.013097	[+0.0078001, +0.018394]
household consumption rate	Full − no pressure	Demand + competition	-0.044457	[-0.050871, -0.038044]
household consumption rate	Full − no pressure	Demand only	+0.012383	[+0.0071148, +0.017651]
household consumption rate	Pressure-channel DiD	Competition vs demand	-0.05684	[-0.063611, -0.05007]
income gini	Competition − demand (full)	Full model	-0.029324	[-0.034412, -0.024235]
income gini	Full − no pressure	Baseline	+0.00032099	[-0.0042949, +0.0049369]
income gini	Full − no pressure	Demand + competition	-0.029743	[-0.035837, -0.023649]
income gini	Full − no pressure	Demand only	+0.0016649	[-0.0030492, +0.006379]
income gini	Pressure-channel DiD	Competition vs demand	-0.031408	[-0.037196, -0.025619]
labor involution	Competition − demand (full)	Full model	+0.22609	[+0.21669, +0.23548]
labor involution	Full − no pressure	Baseline	+0.074487	[+0.070673, +0.078301]
labor involution	Full − no pressure	Demand + competition	+0.30308	[+0.29339, +0.31277]
labor involution	Full − no pressure	Demand only	+0.075883	[+0.071768, +0.079997]
labor involution	Pressure-channel DiD	Competition vs demand	+0.2272	[+0.21763, +0.23677]
benchmark consumption welfare index	Competition − demand (full)	Full model	-0.16933	[-0.17378, -0.16488]
benchmark consumption welfare index	Full − no pressure	Baseline	+0.038154	[+0.031142, +0.045167]
benchmark consumption welfare index	Full − no pressure	Demand + competition	-0.14054	[-0.14883, -0.13225]
benchmark consumption welfare index	Full − no pressure	Demand only	+0.036329	[+0.029675, +0.042982]
benchmark consumption welfare index	Pressure-channel DiD	Competition vs demand	-0.17687	[-0.1822, -0.17155]

Outcome	Comparison	Scenario/ablation	Mean	95% MC interval
p90 weekly hours	Competition − demand (full)	Full model	+0.61899	[+0.41927, +0.81871]
p90 weekly hours	Full − no pressure	Baseline	+4.5257	[+3.8931, +5.1582]
p90 weekly hours	Full − no pressure	Demand + competition	+5.3244	[+4.7665, +5.8823]
p90 weekly hours	Full − no pressure	Demand only	+4.5879	[+4.0305, +5.1453]
p90 weekly hours	Pressure-channel DiD	Competition vs demand	+0.73651	[+0.20445, +1.2686]
real consumption	Competition − demand (full)	Full model	-29.113	[-30.577, -27.649]
real consumption	Full − no pressure	Baseline	+13.664	[+11.783, +15.546]
real consumption	Full − no pressure	Demand + competition	-19.158	[-21.423, -16.893]
real consumption	Full − no pressure	Demand only	+12.98	[+11.025, +14.935]
real consumption	Pressure-channel DiD	Competition vs demand	-32.138	[-33.981, -30.295]
real gdp	Competition − demand (full)	Full model	-64.613	[-67.852, -61.373]
real gdp	Full − no pressure	Baseline	+31.353	[+27.456, +35.251]
real gdp	Full − no pressure	Demand + competition	-41.407	[-46.629, -36.185]
real gdp	Full − no pressure	Demand only	+30.536	[+26.617, +34.455]
real gdp	Pressure-channel DiD	Competition vs demand	-71.943	[-75.459, -68.428]
time adjusted welfare index	Competition − demand (full)	Full model	-0.11294	[-0.11492, -0.11096]
time adjusted welfare index	Full − no pressure	Baseline	+0.0030534	[-0.00082597, +0.0069327]
time adjusted welfare index	Full − no pressure	Demand + competition	-0.11526	[-0.1193, -0.11122]
time adjusted welfare index	Full − no pressure	Demand only	+0.0020137	[-0.0015572, +0.0055846]
time adjusted welfare index	Pressure-channel DiD	Competition vs demand	-0.11727	[-0.11996, -0.11458]
unemployment rate	Competition − demand (full)	Full model	+0.33814	[+0.32926, +0.34703]
unemployment rate	Full − no pressure	Baseline	-0.076064	[-0.090062, -0.062066]
unemployment rate	Full − no pressure	Demand + competition	+0.28074	[+0.2642, +0.29728]
unemployment rate	Full − no pressure	Demand only	-0.072425	[-0.085702, -0.059148]
unemployment rate	Pressure-channel DiD	Competition vs demand	+0.35316	[+0.34254, +0.36379]

Notes: Means and 95% paired Monte Carlo intervals over 30 common random seeds, conditional on the fixed inputs and model structure. The DiD is $(\text{full} - \text{no pressure})_{\text{competition}} - (\text{full} - \text{no pressure})_{\text{demand}}$. Simulation p-values and standardized seed effect sizes are not reported: additional replications can make a difference built into the model arbitrarily precise without making it substantively important (White et al., 2014, cited in the main text). The archived inference output retains those statistics for reproducibility only.

Supplementary Section S6. Reproducibility boundary

Archived simulation outputs include trial-level values, cell summaries, complete paired comparisons, the Latin-hypercube design, draw-level sensitivity claims, criterion assessments, manifests and code/input hashes. The reproduction workflow first verifies licensed-data prerequisites, then reproduces public aggregate targets and reported simulations. A public user without CFPS access can verify all paper tables from the disclosure-safe aggregate inputs and archived simulation outputs but cannot reconstruct the licensed record-level inputs. Under the CFPS data-user agreement, neither original nor modified CFPS data are distributed through a journal website or unauthorized third-party platform (https://www.isss.pku.edu.cn/cfps/en/data/DataUserAgreement/1201867cfps1382470.htm). Absolute local paths, temporary logs, raw CFPS files, derived person- and household-level panels, and sub-provincial geographic information are excluded from release. If the release contains CFPS-derived processed inputs, it should be deposited through the CFPS data centre or Peking University Open Research Data Platform, or through another repository only after written permission from the data provider.

Supplementary Section S7. Construction and provenance of the 2017 SAM

The macro anchor is an author-constructed derived dataset, not an official SAM published in this exact 51-account form. It combines China's 2017 national input-output table, the National Bureau of Statistics flow-of-funds statement for real transactions and the People's Bank of China flow-of-funds statement for financial transactions. The input-output source provides intermediate use, final consumption, capital formation, trade, labour compensation and operating surplus. The two flow-of-funds sources provide institutional income, transfers, capital formation and financial transactions in currency, deposits, loans, equity and bonds. A documented transformation workbook aggregates source industries before 19 production and 19 commodity accounts are retained.

The first author, Wei Wu, used a year-adapted snapshot of the open-source SAM project at https://gitee.com/wild_ana_wuwei/sam, referenced to commit `be8cef8692ecc4b5f2a2daf51471a7bf6d705e77`. The code is covered by the MIT licence; that software licence does not automatically govern redistribution of the official statistical workbooks.

The construction routine places counterpart entries for currency, deposits, loans, bonds and equity through the financial-market account. Household, firm and government row–column gaps are routed through that account; the real-capital gap is placed in the government column, and rest-of-world and equity counterparts are also recorded explicitly. These are transparent construction choices, not entries in an official published SAM.

Running the preserved year-adapted code on the preserved 2017 inputs reproduces all row and column labels and every numeric cell of the expected workbook; the maximum absolute cell difference is zero. The expected workbook has SHA-256 `73886ed2ec6a0051fa8a661c9a216fd8f0f0a38c14d07988eab7e8832d5dc488`. After aggregation, its largest source-account row–column discrepancy is 0.04 source units at account C-R (15,760.37 versus 15,760.41), so the source matrix is not described as exactly balanced at the construction routine's numerical tolerance of 0.001. This diagnostic is separate from the quarterly simulation's stock–flow checks; the largest simulation residual is 9.31e-10.

The local provenance archive retains the three raw statistical workbooks. The public release includes construction code, the account mapping, input hashes, the expected derived workbook and validation instructions; raw official files are included publicly only after their redistribution terms are confirmed.

Supplementary Section S8. Additional results tables

This supplementary section provides the full tabular detail for three analyses referenced in the main text: the reduced-form proxy regression for θ_G (Section 4.3), the upper-tail friction specification (Section 5.6), and the alternative welfare indices (Section 5.4).

The alternative indices vary the credit assigned to non-market time; neither establishes a uniquely correct welfare measure. Under the reference unemployment penalty, adding non-market time does not amplify the

Table S10. Reduced-form proxy regression for the income-gap pressure coefficient θ_G

	Person + year FE		Between (cross-section)	
Regressor	Coef. (cluster SE)	p	Coef. (cluster SE)	p
Income gap G (refgroup)	-1.621 (2.019)	0.422	-1.487* (0.768)	0.053
Age	-0.158 (2.321)	0.946	0.305** (0.127)	0.016
Age^2/100	-0.072 (0.712)	0.920	-0.413** (0.166)	0.013
Male	—	—	3.390*** (0.465)	0.000
Urban	—	—	-4.985*** (0.550)	0.000
Observations	3694		12945	
Persons (two survey waves)	1847		—	
Interview-year categories	3		3	
Clusters (province)	31		31	
Interview-year FE	Yes		Yes	
Person FE	Yes		No	
Within R^2	0.666		0.035	

Notes: Dependent variable is CFPS main-job weekly hours. G is the income gap against a province×urban×year mean (wave-mean gives the same sign and significance, unreported). SE clustered by province. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$. The within-person association is negative and not significant; it supplies no positive empirical support for the structural income-gap loading. Measurement and selection limitations do not identify the sign of that loading. There are two survey waves (2016, 2022) and three recorded interview years (2016, 2017, 2022); 2017 interviews belong to the 2016 wave. The fixed-effects sample is balanced: each of 1,847 persons has one observation in each survey wave, with no person–wave duplicates. Supplementary Section S8 documents the sample audit for these estimates.

Table S11. Central cells under the upper-tail friction vs. the frictionless specification

Spec	Ablation / Scenario	Mean hours	P90	Share > 60	Unemp.	W^C	W^T
Frictionless	Full model, Demand + competition	65.85	79.96	69.1%	55.5%	-0.277	-0.266
	Full model, Demand shock	55.62	79.34	41.3%	21.7%	-0.108	-0.153
	Anchored hours, no pressure, Demand + competition	52.10	74.63	28.7%	27.4%	-0.136	-0.151
	Anchored hours, no pressure, Demand shock	52.18	74.75	28.6%	28.9%	-0.144	-0.155
Upper-tail friction	Full model, Demand + competition	58.23	79.81	46.6%	42.0%	-0.209	-0.213
	Full model, Demand shock	53.89	77.77	36.5%	23.3%	-0.116	-0.149
	Anchored hours, no pressure, Demand + competition	52.10	74.63	28.7%	27.4%	-0.136	-0.151
	Anchored hours, no pressure, Demand shock	52.18	74.75	28.6%	28.9%	-0.144	-0.155

Notes: Thirty common seeds per cell; upper-tail friction is a quadratic disutility above a 55-hour kink ($\kappa = 0.005$). Under friction the full-minus-no-pressure hours contrast under competition falls from 13.75 to 6.13 hours (positive in all 30 seeds), mean hours from 65.85 to 58.23, the > 60-hour share from 69% to 46.6%, and unemployment is markedly lower; P90 stays near the 80-hour grid bound. Compare Table S6.

Table S12. Four welfare indices across scenarios (full specification)

Scenario	W^C (consumption)	W^T (time-adjusted)	$W^{T,\text{emp}}$ (employed-only)	$W^{T,\text{cap}}$ (capped)
Baseline	-0.106	-0.152	-0.185	—
Demand shock	-0.108	-0.153	-0.187	-0.271
Demand + competition	-0.277	-0.266	-0.352	-0.445
Contrast (comp.−demand)	-0.169	-0.113	-0.165	-0.173

Notes: Thirty-seed means, full specification. W^C is consumption-only; W^T adds non-market time for all households; $W^{T,\text{emp}}$ credits non-market time only to employed workers; $W^{T,\text{cap}}$ caps non-market time at 48 h/week (treating the residual as non-leisure). The competition-minus-demand contrast is negative under all three time-adjusted indices. The employed-only central attenuation remains positive and the capped central attenuation is −0.0042; neither alternative meets the specified 68-of-80 attenuation criterion (Section 5.4).

competition-minus-demand welfare loss. The employment-status index is an exploratory normative sensitivity analysis, with

$$W^{T,\chi} = W^T + (\omega_U - \chi)u.$$

Thus $\chi = \omega_U = 0.5$ exactly reproduces the reference index, whereas $\chi = 0$ removes the unemployment penalty. Moving an unchanged penalty inside the household average cannot change mean welfare. The examined $\chi = 0.8$ is literature-motivated, not calibrated by a demonstrated conversion from income-loss multiples into our

utility units. The table distinguishes the full-model competition-minus-demand ranking $R(\chi)$ from attenuation $A(\chi) = R(\chi) - \Delta_s W^C$. These are separate from the within-competition full-minus-no-pressure contrast $\Delta_p W^T$.

The proxy table distinguishes two survey waves (2016 and 2022) from three recorded interview years (2016, 2017 and 2022). The 2017 interviews belong to the 2016 survey wave. The fixed-effects sample contains 1,847 persons and 3,694 person–wave observations, with one observation per person in each survey wave and no duplicate person–wave records. This sample description reflects an audit of person–wave membership and survey-wave labels for the existing estimates; the coefficients were not re-estimated.

The friction comparison applies a convex cost to candidate hours in both $H^*(P)$ and $H^*(0)$ before their difference is added to the empirical anchor. At zero pressure these optima cancel, which preserves the no-pressure target. The mechanism is not that all empirical baseline schedules lie below the 55-hour kink, nor is the candidate cost a calibrated health penalty on final realized hours.

The exploratory retention results across the same 80 designs are:

Table S13. Exploratory welfare-weight sensitivity in the archived positive-parameter design.

χ	$R < 0$	$A < 0$	Mean R	Mean A
0.00 (no unemployment penalty)	0/80	0/80	0.05347	0.21904
0.25	73/80	0/80	-0.02919	0.13639
0.30	80/80	0/80	-0.04572	0.11986
0.50 (original W^T)	80/80	0/80	-0.11184	0.05374
0.65	80/80	33/80	-0.16143	0.00415
0.75	80/80	73/80	-0.19449	-0.02891
0.78	80/80	79/80	-0.20441	-0.03883
0.80	80/80	80/80	-0.21102	-0.04544
1.00	80/80	80/80	-0.27714	-0.11157

Notes: Δ denotes competition minus demand within the full model. $R(\chi) = \Delta\bar{C} + \Delta\bar{L} - \chi\Delta u$; $A(\chi) = R(\chi) - \Delta W^C$. The original W^T is recovered at $\chi = \omega_U = 0.5$, not at zero. Counts describe 80 complete archived LHS design points, each with one seed; they are design coverage, not population probabilities. The means combine parameter and seed variation. These are aggregate recalculations, not new simulations. $\chi = 0.8$ is a scenario weight, not an independently established calibration.

Table S14. Distinct thresholds for exploratory welfare statements.

Criterion	χ_R	χ_A
Design-mean crossing	0.16171961	0.66254382
68/80 negative	0.22700804	0.72776321
80/80 negative	0.28101993	0.78197332
Margin of $\chi = 0.8$ above 80/80 threshold	0.51898007	0.01802668

Notes: All 80 archived full-model competition-minus-demand contrasts have $\Delta u > 0$. Strict negativity requires χ strictly above the reported boundary; equality gives a zero contrast for a boundary point. The 68/80 criterion is shown only for comparability with the original count rule; it is not a new significance criterion. The design-mean crossing is different from the maximum individual boundary. For future $\Delta u < 0$ contrasts the inequality reverses; when $\Delta u = 0$ the sign is independent of χ.

Table S15. Central welfare contrasts kept separate by estimand.

Specification	Contrast	ΔW^{T} [MC 95%]	$\Delta W^{T,0.8}$ [MC 95%]
No friction	Pressure, demand	0.00201 [−0.00156, 0.00558]	0.02374 [0.01626, 0.03122]
No friction	Pressure, competition	−0.11526 [−0.11930, −0.11122]	−0.19948 [−0.20828, −0.19068]
No friction	Competition–demand, full	−0.11294 [−0.11492, −0.11096]	−0.21438 [−0.21870, −0.21006]
No friction	Pressure-by-scenario DiD	−0.11727 [−0.11996, −0.11458]	−0.22322 [−0.22880, −0.21764]
Convex friction	Pressure, demand	0.00662 [0.00238, 0.01086]	0.02343 [0.01456, 0.03229]
Convex friction	Pressure, competition	−0.06190 [−0.07063, −0.05317]	−0.10562 [−0.12528, −0.08596]
Convex friction	Competition–demand, full	−0.06419 [−0.07271, −0.05567]	−0.12021 [−0.13974, −0.10067]
Convex friction	Pressure-by-scenario DiD	−0.06852 [−0.07721, −0.05984]	−0.12905 [−0.14875, −0.10934]

Notes: Each row uses 30 common archived seeds. Intervals are paired-seed Monte Carlo 95% Student-t intervals for the contrast mean under fixed parameters; they do not include parameter, sampling, or structural uncertainty. Pressure means full minus no-pressure in the named scenario; the DiD subtracts the demand pressure effect from the competition pressure effect. Convex friction uses coefficient 0.005 and a 55-hour kink in the hours optimizer. Welfare-weight changes are diagnostic post-processing.

The within-competition full-minus-no-pressure contrast is $\Delta_p W^T = -0.1153$, whereas the central no-friction full-model competition-minus-demand contrast is $\Delta_s W^T = -0.11294$ (95% paired-seed Monte Carlo interval $[-0.11492, -0.11096]$). At the fixed central parameter vector, $R(0.8) = -0.21438$ with interval $[-0.21870, -0.21006]$ and $A(0.8) = -0.04505$ with interval $[-0.04647, -0.04363]$. Central estimates average 30 paired seeds at fixed parameters; sensitivity summaries average across 80 varying parameter designs. These summaries describe different sources of variation and are reported separately.

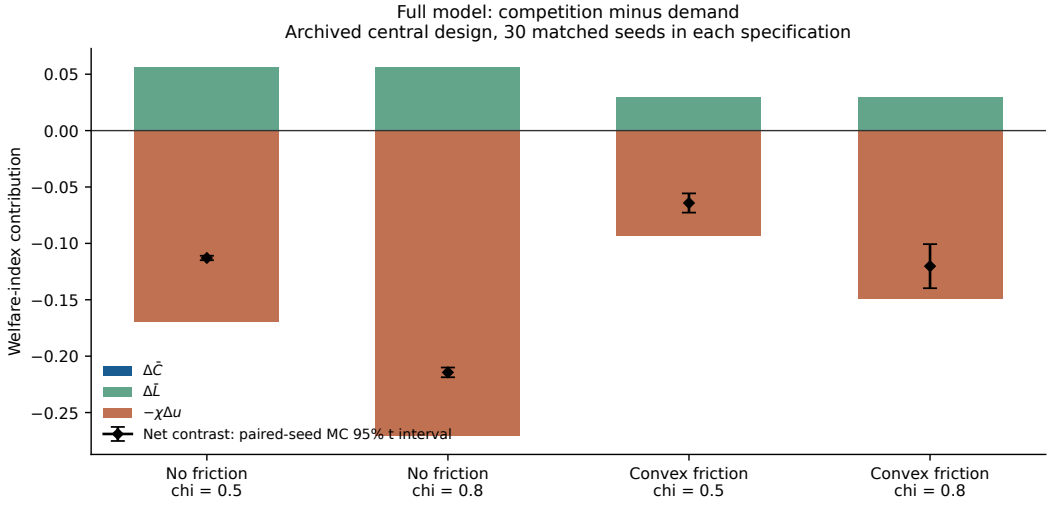


Figure S1. Welfare components reconstructed from archived aggregate outputs. Consumption, time and unemployment contributions use the same population and comparison definitions. These arithmetic summaries use archived simulation outputs and require no additional model simulations.

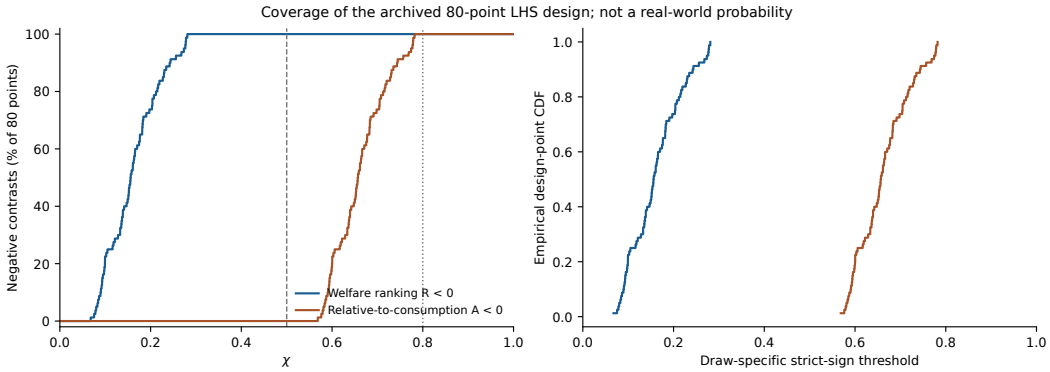


Figure S2. Exploratory welfare thresholds and coverage of the 80 archived positive-loading designs. Mean crossings, the specified 68-of-80 count rule and all-design boundaries answer different questions. Strict negative signs require a weight above the boundary; these are not population probabilities.

Supplementary Section S9. Signed-coefficient, upper-tail and mechanism diagnostics

The supplementary design was frozen before its execution and contains 840 unique tasks: 540 signed-grid, 120 upper-tail-cost and 180 additional mechanism runs. The 60 central signed-grid runs are reused as the L1P1 mechanism reference. All tasks use 300 households, 80 quarters, burn-in 40 and seeds 14501–14530. Shock onset is quarter 41. The analysis is conditional on the fixed calibration and inputs, and is not a preregistration of the original study. All tasks passed the four quarterly financial identities; the largest absolute residual was 9.31×10^{-10}.

The archive records requested and effective configurations, input and code hashes, runtime versions, two quarterly CSV files and the post-window summary. An independent audit verified 1,680 output hashes and recomputed means from 67,200 quarterly records. The reproducible analysis scripts analyze_sensitivity_revision .py and analyze_mechanism_revision.py read these completed runs and the archived positive-region design; they perform no additional model simulations.

S9.1. Signed-coefficient grid

Table S16 compares each coefficient pair to zero pressure within the competition scenario. The grid retains signed pressure rather than truncating negative values. Its three values per loading are scenario choices, not empirical confidence limits. The accompanying CSV also retains demand-only contrasts, direct scenario contrasts and the difference between scenario-specific pressure effects.

Table S16. Signed-grid pressure-minus-zero contrasts within the competition scenario. Means and 95% Monte Carlo intervals use 30 common seeds per cell. GDP is in model units; unemployment is in percentage points. These intervals condition on fixed inputs and model specifications.

θ_G	θ_F	Weekly hours	Real GDP	Unemployment (pp)
−0.25	−0.55	−15.71 [−16.04, −15.37]	−125.19 [−129.02, −121.36]	32.94 [31.59, 34.30]
−0.25	0	−2.83 [−3.07, −2.59]	−52.52 [−57.25, −47.80]	16.05 [14.37, 17.72]
−0.25	0.55	12.22 [11.74, 12.70]	−82.32 [−87.76, −76.88]	38.43 [36.68, 40.18]
0	−0.55	−15.01 [−15.28, −14.73]	−111.58 [−114.86, −108.30]	27.02 [25.83, 28.21]
0	0	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]	0.00 [0.00, 0.00]
0	0.55	13.27 [12.96, 13.58]	−51.78 [−55.24, −48.32]	30.43 [29.26, 31.60]
0.25	−0.55	−13.49 [−13.77, −13.22]	−97.28 [−100.76, −93.80]	21.92 [20.63, 23.21]
0.25	0	3.27 [3.13, 3.40]	30.44 [27.07, 33.81]	−6.27 [−7.53, −5.00]
0.25	0.55	13.75 [13.32, 14.18]	−41.41 [−46.63, −36.19]	28.07 [26.42, 29.73]

S9.2. Magnitude sensitivity in the archived positive region

The 80 archived designs each use one seed and four matched runs (full/zero pressure in demand/competition). Five continuous inputs are varied and four productivity/pay mappings have 20 points each. An additive ordinary-least- squares response surface includes an intercept, standardized continuous inputs and three mapping indicators, with linear/capped pay as the reference. Responses are standardized for the coefficient table. There are no coefficient significance tests. These are conditional descriptive associations, not Sobol indices, variance shares or structural effects.

A reproducible five-fold split uses random seed 20261014 and places four points from each mapping in each test fold. Scaling is fitted on training folds only. Pooled held-out R^2 is one minus the held-out squared prediction

error divided by squared deviations from the overall response mean. This tests a simple surrogate within the sampled domain, not external validation. Because each design has one seed, parameter and stochastic variation are not separately estimated. Partial-rank correlations in the CSV residualize ranked predictors and outcomes against the other ranked continuous inputs and mapping controls; they carry the same limitations.

Table S17. Descriptive standardized response-surface coefficients for the archived 80-point design. Each continuous predictor and response is standardized by its sample standard deviation; three mapping indicators are included with linear-capped as the reference. No coefficient significance tests are used.

Contrast / outcome	θ_G	θ_F	ω_L	T	λ_H
Pressure: weekly hours	0.06	0.85	−0.02	0.14	0.21
Amplification: weekly hours	−0.34	0.77	0.01	0.08	0.14
Pressure: real GDP	0.09	0.09	−0.01	0.09	0.05
Pressure: unemployment (pp)	−0.10	0.15	0.04	−0.15	−0.08
Welfare ranking $R(0.5)$	0.12	−0.34	0.87	−0.11	−0.12
Welfare attenuation $A(0.5)$	0.29	−0.12	0.83	−0.08	−0.02

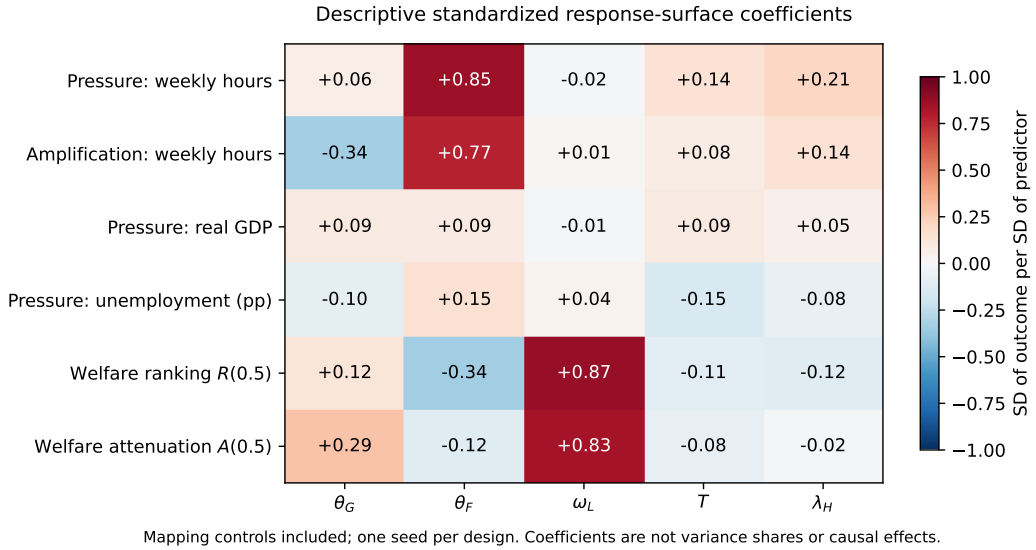


Figure S3. Descriptive response-surface diagnostics for the archived 80-point positive-loading design. Standardized associations and held-out fit describe this sampled model region. They do not provide population inference, global variance decomposition or uncertainty separated from simulation seeds.

S9.3. Decision-stage hours-boundary diagnostics

The cost comparison uses $\kappa = 0$ versus 0.005, with kink 55 hours. Near-bound means actual hours ≥ 79.5; strict clipping means the target before clipping exceeds 80. A target equal to 80 is recorded separately in the CSV. The denominator is employment at hours choice, before production and exits. Empty denominators are recorded as zero with their employment count. These shares must not use period-end employment as their denominator. Current consecutive near-bound streaks reset on non-employment or hours below 79.5; their average includes zeros among employed households. This is not a completed-episode duration or survival estimate, and streaks can include pre-shock periods.

S9.4. Stage-specific mechanism diagnostics

All entries below compare competition plus demand with demand only, within each switch setting, and average quarters 41–80 before pairing 30 seeds. $L = 0$ removes only above-anchor labour increments, preserving the wage map and below-anchor reductions; $P = 0$ removes only the explicit price-pressure term in markup updating. Both leave other competition responses active. Means of quarterly funding ratios differ from ratios

Table S18. Boundary diagnostics at the central positive-pressure setting, quarters 41–80.

Scenario	Cost	Near bound (%)	Target clipped (%)	Streak (q)	P90 (h)
Demand	None	10.51 [10.15, 10.88]	8.06 [7.60, 8.51]	2.41 [2.26, 2.56]	79.34 [79.13, 79.55]
Demand	Upper tail	8.77 [8.51, 9.03]	4.79 [4.48, 5.10]	1.99 [1.87, 2.12]	77.77 [77.54, 78.01]
Demand+comp.	None	26.75 [25.83, 27.68]	28.82 [27.83, 29.82]	6.37 [6.03, 6.70]	79.96 [79.94, 79.97]
Demand+comp.	Upper tail	13.77 [13.27, 14.27]	14.38 [13.81, 14.94]	3.29 [3.09, 3.49]	79.81 [79.77, 79.86]

Near bound means actual weekly hours ≥ 79.5; target clipping means a pre-clipping target strictly above 80. Both shares use decision-stage employed households, before firm exit. Streak is the mean current consecutive near-bound duration among those employed at that stage, including zeros, and is not a survival estimate. Entries are cell means and 95% Monte Carlo intervals across 30 seeds. Upper-tail cost has coefficient 0.005 and kink 55 hours.

of post-window means; the tables use the former. Seed-level switch differences and the factorial interaction are retained in the accompanying CSV.

Table S19. Mechanism diagnostics: planning. Competition-plus-demand minus demand-only, quarters 41–80.

Outcome	L1P1	L0P1	L1P0	L0P0
Expected demand (quantity units)	−63.73 [−67.05, −60.42]	−85.79 [−89.18, −82.40]	−65.08 [−68.23, −61.94]	−83.94 [−86.92, −80.95]
Desired headcount (workers)	−58.92 [−62.08, −55.76]	−68.05 [−70.88, −65.23]	−61.11 [−63.76, −58.47]	−66.68 [−69.30, −64.06]
Vacancies before matching (positions)	34.40 [33.28, 35.52]	19.26 [18.67, 19.85]	33.13 [32.33, 33.94]	19.16 [18.67, 19.66]
Random separations (workers/quarter)	−3.52 [−3.66, −3.39]	−3.19 [−3.30, −3.08]	−3.48 [−3.62, −3.34]	−3.15 [−3.28, −3.02]
Planning layoffs (workers/quarter)	−0.19 [−0.21, −0.16]	−0.15 [−0.18, −0.12]	−0.20 [−0.23, −0.17]	−0.19 [−0.22, −0.16]
New matches (workers/quarter)	−8.21 [−8.36, −8.06]	−7.37 [−7.50, −7.23]	−8.18 [−8.32, −8.04]	−7.35 [−7.49, −7.22]
Employment after matching (workers)	−101.53 [−104.19, −98.87]	−94.68 [−98.02, −91.35]	−102.43 [−105.06, −99.80]	−93.20 [−96.13, −90.26]
Effective labor (anchor units)	−76.87 [−80.74, −73.01]	−94.68 [−98.02, −91.35]	−78.72 [−81.98, −75.46]	−93.20 [−96.13, −90.26]

Means and 95% paired Monte Carlo intervals over 30 common seeds. Funding and approval shares are computed quarterly before averaging. These diagnostics are endogenous joint responses; their differences do not identify a channel's empirical causal contribution.

Table S20. Mechanism diagnostics: finance. Competition-plus-demand minus demand-only, quarters 41–80.

Outcome	L1P1	L0P1	L1P0	L0P0
Credit requested (nominal units)	679 [−37, 1396]	5682 [4718, 6647]	−513 [−1195, 168]	2430 [1707, 3154]
Credit approved (nominal units)	−48 [−545, 448]	2740 [2160, 3321]	−783 [−1198, −369]	1168 [672, 1664]
Loan spread (pp/q)	0.01 [0.01, 0.02]	0.03 [0.02, 0.03]	0.01 [0.00, 0.01]	0.02 [0.01, 0.02]
Planned investment (nominal units)	985 [598, 1372]	−1803 [−2090, −1517]	2551 [2178, 2924]	−7 [−287, 274]
Funded investment (nominal units)	257 [−236, 751]	−4745 [−5450, −4040]	2281 [1848, 2714]	−1269 [−1666, −872]
Funded/planned investment (pp)	−1.23 [−1.82, −0.64]	−6.05 [−7.22, −4.88]	−0.18 [−0.89, 0.52]	−2.39 [−3.01, −1.77]
Approved/requested credit (pp)	−3.40 [−4.86, −1.94]	−6.73 [−8.52, −4.94]	−3.08 [−4.79, −1.37]	−3.53 [−4.73, −2.33]

Means and 95% paired Monte Carlo intervals over 30 common seeds. Funding and approval shares are computed quarterly before averaging. These diagnostics are endogenous joint responses; their differences do not identify a channel's empirical causal contribution.

Table S21. Mechanism diagnostics: settlement. Competition-plus-demand minus demand-only, quarters 41–80.

Outcome	L1P1	L0P1	L1P0	L0P0
Markup (pp)	−21.94 [−22.29, −21.59]	−25.38 [−25.59, −25.18]	1.09 [0.91, 1.27]	1.10 [0.94, 1.26]
Price pressure (index units)	0.25 [0.25, 0.25]	0.25 [0.25, 0.25]	0.25 [0.25, 0.25]	0.25 [0.25, 0.25]
Wage squeeze (pp)	0.07 [0.06, 0.07]	0.10 [0.10, 0.10]	0.04 [0.04, 0.04]	0.07 [0.07, 0.07]
Output before exit (quantity units)	−76.08 [−79.61, −72.56]	−97.66 [−101.34, −93.98]	−77.40 [−80.79, −74.01]	−95.57 [−98.81, −92.34]
Orders before exit (quantity units)	69.46 [67.64, 71.28]	68.74 [66.86, 70.61]	−11.58 [−13.11, −10.05]	−14.71 [−16.48, −12.94]
Profit rate before exit (pp/q)	−1.64 [−1.70, −1.57]	−2.35 [−2.44, −2.26]	−1.04 [−1.11, −0.98]	−1.72 [−1.80, −1.64]
Utilization before exit (pp)	1.99 [1.86, 2.13]	1.40 [1.30, 1.51]	1.90 [1.77, 2.03]	1.37 [1.28, 1.46]
Firm defaults (firms/quarter)	0.15 [0.11, 0.18]	0.24 [0.21, 0.27]	0.15 [0.13, 0.18]	0.17 [0.15, 0.20]
Consumption budget (nominal units)	−6223 [−6773, −5674]	−4056 [−4632, −3480]	−7242 [−7689, −6794]	−4640 [−5253, −4028]

Means and 95% paired Monte Carlo intervals over 30 common seeds. Funding and approval shares are computed quarterly before averaging. These diagnostics are endogenous joint responses; their differences do not identify a channel's empirical causal contribution.

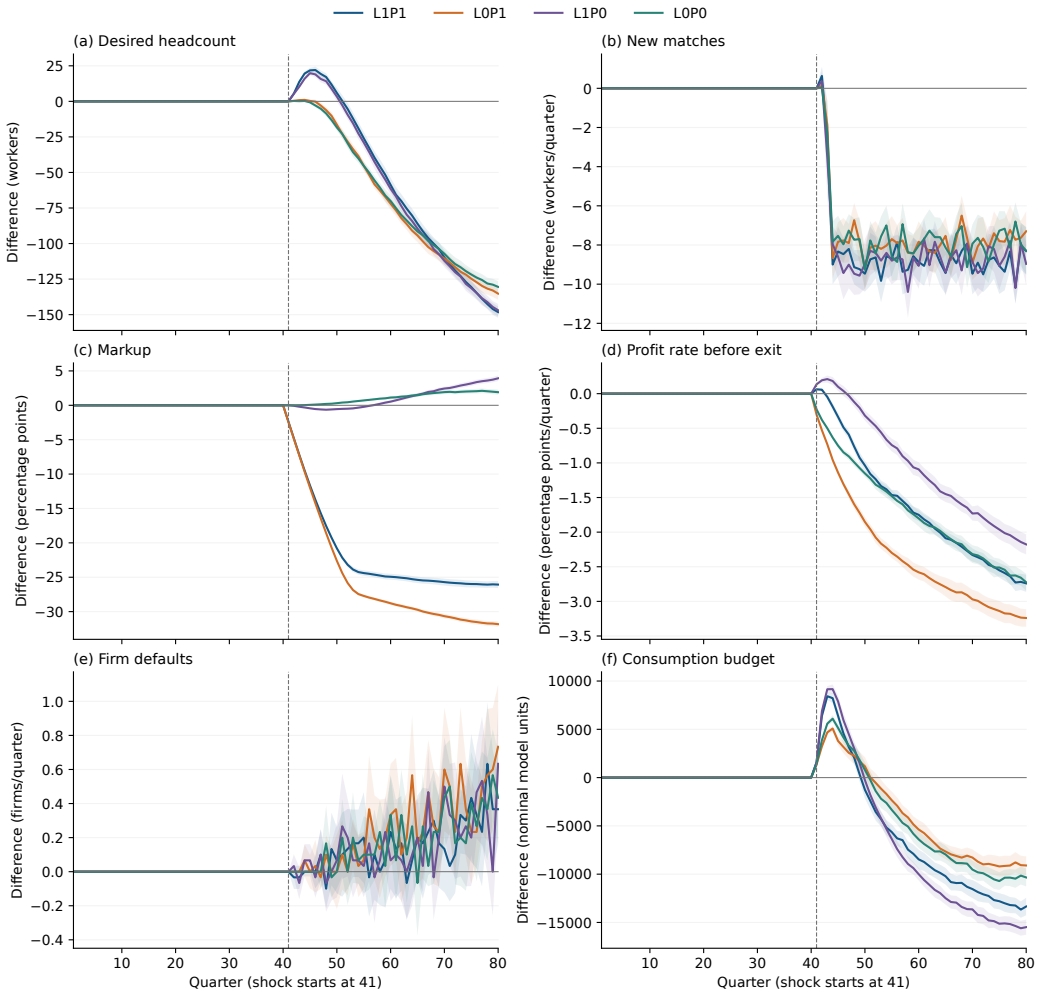


Figure S4. Intermediate-state competition-minus-demand trajectories. Bands are pointwise paired Monte Carlo intervals over 30 seeds. Vacancies are measured before matching; profit/default measures precede firm replacement. These stage definitions prevent conflicting denominators from being read as one causal decomposition.

Expected demand updates toward realized prior output/sales, whereas incoming orders include unmet quantities. The headcount rule does not divide by current hours. Credit approval depends on needs, access, leverage and bank capital, then applies a wage-bill backstop. Thus changes in expected demand, order quantities, lending levels and conditional funding shares answer different questions. The large employment effects and continued movement through quarter 80 limit quantitative interpretation; no stationary equilibrium or unique dominant channel is established by these diagnostics.

Supplementary Section S10. Wage–employment–consumption transmission

S10.1. Design, initial matching and measurement

The exploratory transmission design comprises 480 simulations: four settings of base consumption propensities and direct wage squeezing, two scenarios, two pressure states and 30 seeds (14501–14530). Each run uses 300 households and 80 quarters, with the shock at quarter 41. Full pressure uses $(\theta_G, \theta_F) = (0.25, 0.55)$; zero pressure sets both to zero. Other parameters, the linear pay mapping, hours-productivity rule and markup-pressure term remain at the central setting. The transmission design was finalized after the primary analysis and peer review, but before execution. It was not an original-study preregistration. The first seed's 16-cell pilot is included in the 480 runs. There was no outcome-based selection.

The wage switch skips only the multiplier $1 - s_f^w$ in the wage offer, where $s_f^w = \alpha_w \max(0.05 - \pi_f, 0)$. It preserves the raw pressure state, utilization and Phillips adjustments, wage floor and all other model responses. Uniform base propensity uses deterministic bisection on the full static budget function at the common initialization, before dynamic first-quarter decisions. For every seed, one common propensity between the original minimum and maximum matches the heterogeneous aggregate budget, including nonlinear modifiers, floors and liquidity caps. The same value is used in every cell for that seed and in both the hours-choice and budget functions. It is never rebalanced along the path. This matches an initial static budget, not the first realized quarter or the end of burn-in. Wealth, income, saving and other heterogeneity persist.

All contrasts pair the same seeds before averaging. Common initialization does not guarantee identical random events after endogenous paths diverge. Intervals are conditional 95% Student-t Monte Carlo intervals over 30 seeds; trajectory bands are pointwise. They do not include parameter, survey, population or structural uncertainty. $I_k - I_{\text{baseline}}$ is a total model response to removing a rule, not a causal mediation share. The joint interaction is $I_{\text{both}} - I_{\text{uniform}} - I_{\text{no squeeze}} + I_{\text{baseline}}$.

The wage snapshot is taken after hours and credit decisions and before markets, settlement and default replacement. It captures workers paid for the current production period even if their employer exits afterwards. The original period-end employment and labour-income fields remain unchanged for backward compatibility and must not substitute for this snapshot.

S10.2. Wage accounting and income distribution

For each seed, scenario and quarter, decompose the full-minus-zero change in $W = N\bar{h}r$ by averaging all six orders of replacing the three factors. Then subtract the DEM decomposition from COMP and average quarters. This Shapley allocation has no residual, is invariant to factor ordering and includes interactions symmetrically. The effective rate r includes pay and composition changes and has units of quarterly wage per weekly-hour equivalent. Neither r nor its component uniquely measures the direct wage-squeeze rule.

Table S22. Symmetric accounting decomposition of wage-income interaction, quarters 41–80.

Specification	Employment	Hours	Effective rate	Total
Baseline	-28700.26 [−29597.00, −27803.51]	7664.96 [7311.38, 8018.55]	3765.77 [3381.18, 4150.36]	-17269.52 [−18181.65, −16357.38]
Uniform base MPC	-28953.12 [−29889.30, −28016.95]	7768.44 [7483.58, 8053.30]	3897.03 [3563.42, 4230.64]	-17287.65 [−18187.03, −16388.27]
Wage squeeze off	-29320.84 [−30141.98, −28499.69]	7648.57 [7342.52, 7954.62]	3822.51 [3445.91, 4199.11]	-17849.75 [−18686.66, −17012.85]
Both	-28721.30 [−29571.68, −27870.92]	8077.71 [7820.50, 8334.92]	3494.04 [3072.23, 3915.84]	-17149.55 [−18020.65, −16278.44]

Nominal model units per quarter; paired means and 95% Monte Carlo intervals. Components sum to the total before rounding; their marginal interval endpoints need not sum. These are accounting allocations.

With original fixed household base propensities a_i and the consumption income basis B_i (the existing blend of disposable and expected income),

$$\sum_i a_i B_i = \bar{a} \sum_i B_i + N \operatorname{Cov}_N(a_i, B_i).$$

The population-denominator covariance separates the amount of income basis from its association with original propensity weights. Original weights are retained even in uniform-propensity runs, to avoid mechanically defining away distributional differences. The active uniform-propensity covariance is separately verified to be zero. This identity describes one budget input; wealth terms, saving modifiers, floors and liquidity caps prevent it from being an exact decomposition of final consumption. An analogous wage-only identity and fixed-original high/low-propensity group accounts are in the CSVs.

Table S23. Original-propensity income-basis accounting: four-cell interactions, quarters 41–80.

Specification	Weighted income term	Amount term	Covariance term
Baseline	-10171.45 [−10726.15, −9616.75]	-10043.58 [−10595.63, −9491.52]	-127.87 [−156.74, −98.99]
Uniform base MPC	-10116.83 [−10723.03, −9510.63]	-9991.19 [−10591.47, −9390.90]	-125.65 [−164.00, −87.30]
Wage squeeze off	-10474.13 [−11026.05, −9922.21]	-10342.39 [−10891.49, −9793.29]	-131.74 [−163.80, −99.67]
Both	-10147.80 [−10729.99, −9565.61]	-9978.65 [−10547.29, −9410.01]	-169.15 [−211.48, −126.82]

Nominal model units per quarter; paired means and 95% Monte Carlo intervals. Original propensity weights are fixed within a seed. This is not a decomposition of final consumption.

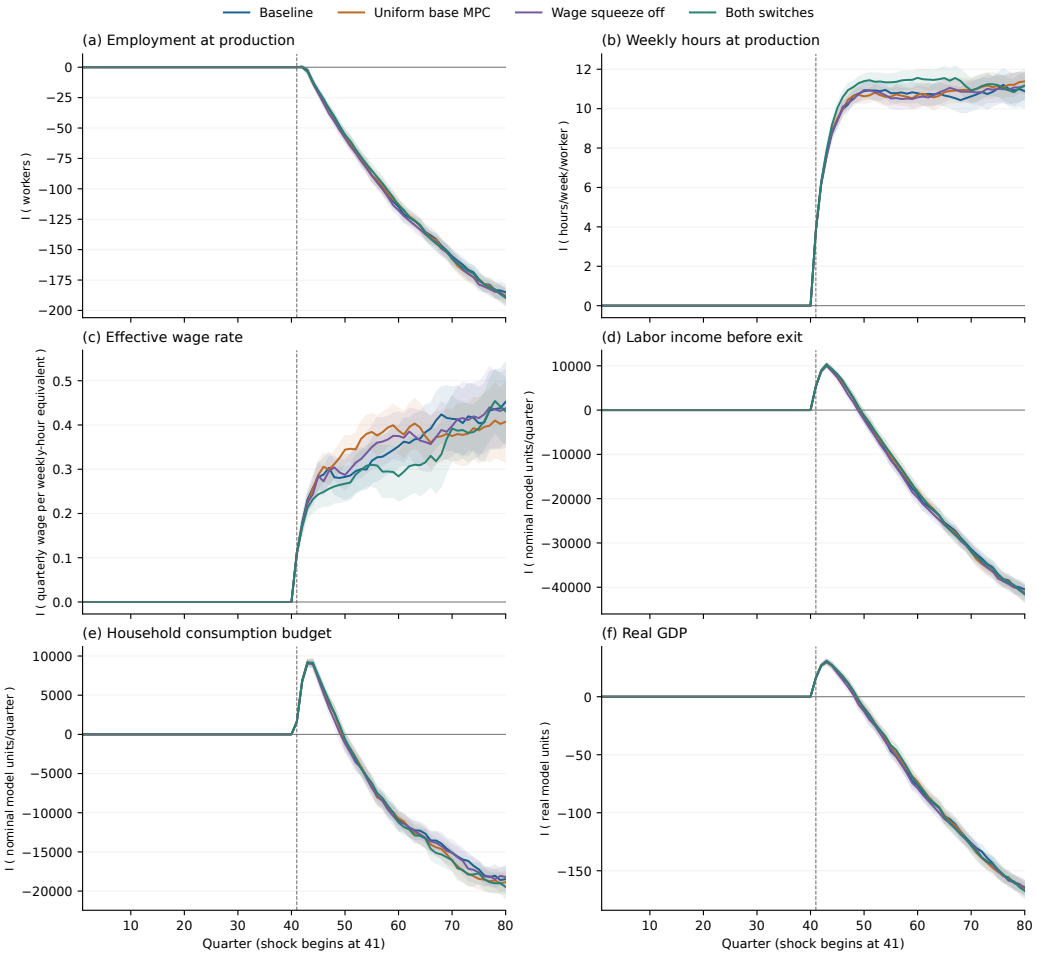


Figure S5. Four-cell interactions I_k for production employment, hours, effective payment rate, wage income, household budget and GDP. Bands are pointwise 95% conditional Monte Carlo intervals. GDP uses the model's expenditure deflator and is distinct from physical output quantity.

S10.3. Orders, capacity and temporal windows

Effective capacity is the sum of firm-level minima of labour and capital capacities (with the original numerical floor), not the minimum of sectoral totals. Orders, realized quantities and unfilled orders are recorded

before firm replacement. Capacity-constrained share counts firms whose orders exceed their own capacity. The separate labour-minimum share only compares labour with capital capacity; a firm with low demand need not be actually constrained by either. Unused capacity equals the sum of capacity minus realized output. Unfilled orders and unused capacity can coexist across firms.

Consumption-sector orders include household, government and export orders; household nominal budgets and realized spending are separately recorded. Price changes break a one-to-one relationship between nominal budgets and order quantities. The physical-production diagnostics therefore supplement, rather than replace, the model's GDP measure.

Table S24. Baseline demand and capacity diagnostics, quarters 41–80.

Metric	Pressure effect in COMP	Four-cell interaction
	-3718.71	-8152.56
Household budget	[−4754.51, −2682.92]	[−8812.77, −7492.35]
	-7491.60	-12737.74
Household realized spending	[−8376.13, −6607.06]	[−13557.83, −11917.64]
	-10.52	-32.79
Order quantity	[−14.49, −6.56]	[−34.91, −30.68]
	-42.68	-87.57
Effective capacity	[−48.87, −36.49]	[−91.65, −83.48]
	-45.20	-83.11
Sales quantity	[−51.03, −39.36]	[−86.96, −79.26]
	34.67	50.32
Unfilled orders	[30.56, 38.78]	[46.96, 53.68]
	2.52	-4.46
Unused capacity	[1.81, 3.23]	[−5.12, −3.80]
	-0.29	6.56
Capacity-constrained share (pp)	[−1.03, 0.44]	[5.76, 7.37]

First two rows: nominal units per quarter. Middle rows: quantity units per quarter. Final row: percentage points. Total orders include non-household sectors. Means and 95% Monte Carlo intervals.

Table S25. Baseline four-cell interactions across transition windows.

Quarters	Real GDP	Employment	Wage income	Budget
	13.89	-23.92	5376.75	4639.64
41–50	[11.90, 15.87]	[−25.68, −22.16]	[4846.65, 5906.86]	[4205.23, 5074.05]
	-48.20	-89.74	-11614.14	-6841.91
51–60	[−53.03, −43.37]	[−94.06, −85.42]	[−12863.85, −10364.44]	[−7746.97, −5936.86]
	-104.06	-136.89	-25822.82	-13106.63
61–70	[−109.16, −98.96]	[−141.74, −132.05]	[−27155.09, −24490.56]	[−13983.16, −12230.10]
	-149.40	-174.03	-37017.86	-17301.35
71–80	[−154.35, −144.46]	[−179.23, −168.82]	[−38337.71, −35698.02]	[−18318.63, −16284.06]

GDP in real model units; employment in workers; wage income and budget in nominal units per quarter. Paired means and 95% Monte Carlo intervals. Window averages do not establish causal ordering or convergence.

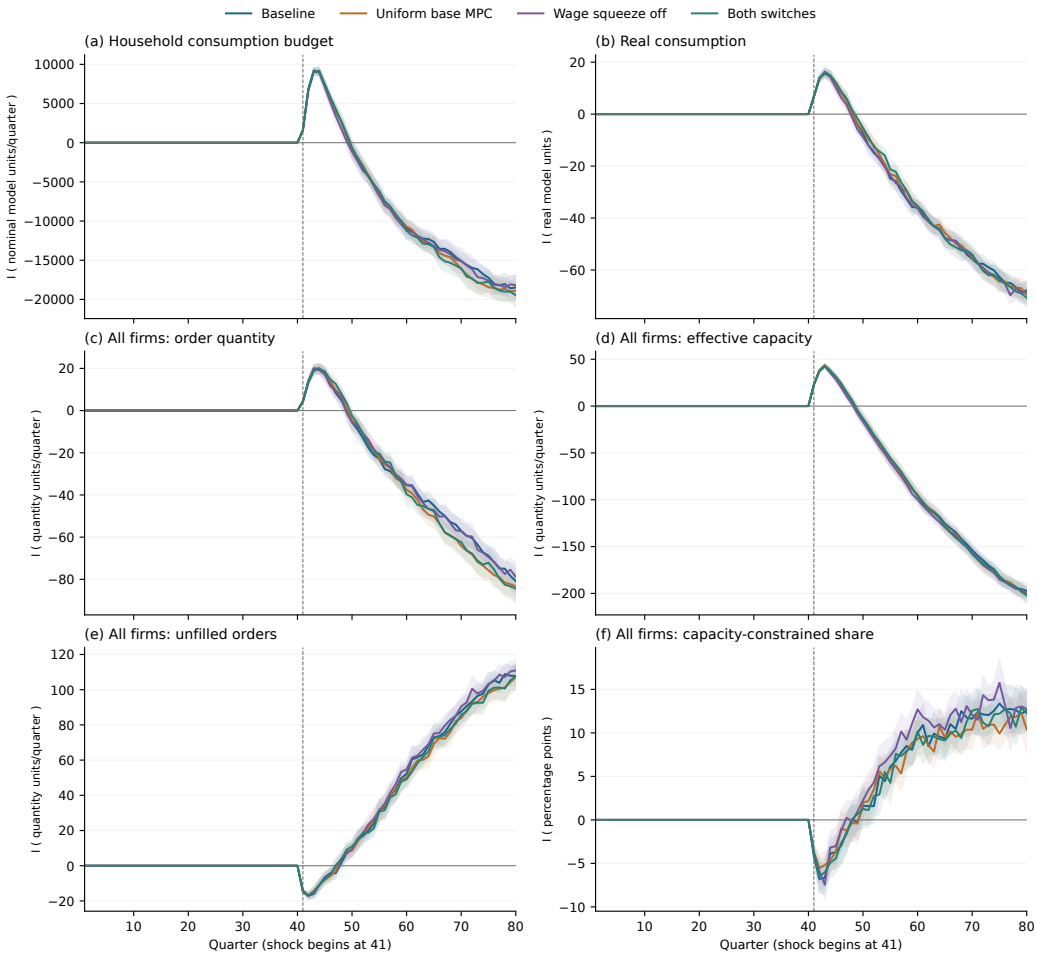


Figure S6. Four-cell interactions for household nominal budget, real consumption, total order quantity, effective capacity, unfilled orders and the capacity- constrained firm share. These diagnostics distinguish demand responses from production constraints. Temporal ordering alone does not identify mediation.

S10.4. Reproduction and verification

All 480 tasks succeed and all 38,400 quarterly records are complete. The 960 quarterly-file hashes, requested and effective configurations, input hashes and code hashes were checked. The maximum of the four SFC accounting gaps is 9.31×10^{-10}, below 10^{-3}. All 120 transmission baseline cells match every inherited quarterly numeric column exactly. Within each mechanism setting and pressure state, DEM and COMP are identical in quarters 1–40. Initial common propensities match across all 16 cells per seed and remain frozen. These checks establish implementation and accounting consistency, not empirical realism. The scripts run_transmission.py, analyze_transmission.py and verify_final_reproducibility.py are supplied in the replication archive. The independent verification entry is scripts/verify_final_reproducibility.py; it verifies archived outputs and aggregate reanalysis without requiring CFPS records or launching new simulations. The archive also contains the frozen design, aggregate outputs and audit records.