Designing Incentives for Multitasking Agents: Evidence from Payments to Physicians in England

Filippo Paternollo (Columbia)
Pietro Tebaldi (Columbia)
Andre Veiga (Imperial)

CEPR-TSE Health Economics Conference, June 2025

Incentive Design with Multi-tasking

- Many incentive design problems involve multi-tasking, i.e., tasks are complements / substitutes
  - doctor tests blood for illness A $\rightarrow$ easy to also test for illness B
  - teacher spends more time on subject A $\rightarrow$ hard to also increase exam scores in subject B
- Well developed theory since Holmstrom and Milgrom [1991]
- Empirics have lagged behind:
  - counterfactuals require estimating interaction between pairs of tasks $\rightarrow$ # of parameters grows rapidly with # of tasks
  - most applied work focuses on testing

This Paper

- Empirically tractable model of multitasking
- Proof of sufficient conditions for identification combining
  - aggregate variation in incentives
  - cross-sectional variation across agents in exposure to tasks
- Application to Quality and Outcomes Framework (QOF) in England
  - world's largest pay-for-performance scheme in primary care
- Strong evidence of interactions between tasks (multitasking)
- Counterfactuals (preliminary):
  - removal of QOF: payer's utility $\downarrow$ by 5%
  - optimal re-design: payer's utility $\uparrow$ by 3%

Roadmap

GP clinics (GPCs)

- $\approx$ 8000 GPCs in England
- Provide prescriptions, minor interventions, referral to secondary care
- Zero prices to patients
- Revenue:
  - $\approx$ 75% capitation (# of individuals registered, very mild risk adjustment)
  - $\approx$ 25% financial incentives, mainly from QOF

Quality and Outcomes Framework (QOF)

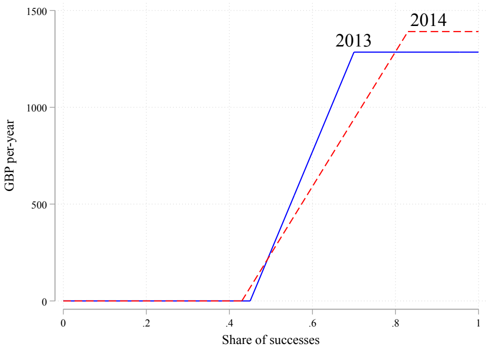
- Started 2004; several changes over time
- Gives GPCs yearly financial incentives to perform tasks (“indicators”), e.g.:
  - DM11: % of diabetes patients in whom the last glycohaemoglobin IFCC-HbA1c $\leq$ 64 mmol/mol
  - PAD4: % of patients with peripheral arterial disease taking aspirin or an alternative anti-platelet
- Success rate between 0% and 100%
- Total payments $\approx$ £1B / year
- Electronic record-keeping $\rightarrow$ minimal errors / cheating
- We focus on 40 “truly clinical” indicators

Data

- NHS public data covering 2009-2019
- GPC i, indicator j, year t
- Achievement y_{ijt}
- GPC covariates x_{it} (# of doctors in the clinic, average age, share of fully qualified physicians)
- # of relevant patients n_{ijt} (diabetics, asthmatics, etc)
- Incentives for each indicator over time

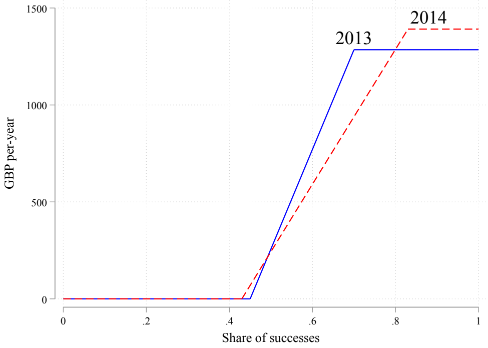
Piecewise linear incentives

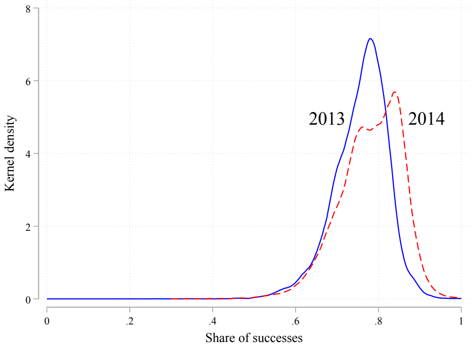
- Success rate $y_{ijt} \in [0,1]$
- Revenue per patient has slope α_{jt} for $y_{ijt} \in \left[\underline{y_{jt}}, \overline{y_{jt}}\right]$
- For instance, DM11 in a GPC with 300 patients:



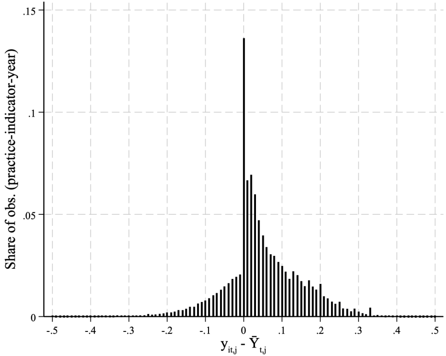
Piecewise linear incentives

- Success rate $y_{ijt} \in [0,1]$
- Revenue per patient has slope α_{jt} for $y_{ijt} \in \left[\underline{y_{jt}}, \overline{y_{jt}}\right]$
- For instance, DM11 in a GPC with 300 patients:





Bunching suggests strong response to financial incentives



For all indicators, distribution of $y_{ijt} - \overline{y_{jt}}$

- Achievement above $\overline{y_{jt}}$ suggests non-financial motivation and/or complementarities between tasks
  - there is heterogeneity in bunching across indicators Details

Summary of Reduced Form Evidence (details in the paper)

- Practices respond to
  - incentives
  - incentives $\times$ exposure (n. of relevant patients)
- Cross-indicator interactions:
  - $\uparrow\uparrow$ incentives for j $\Rightarrow$ Δ outcomes of k, ceteris paribus

◂ Details

Roadmap

Simplified model: 1 task

- 1 GPC
- 1 Task
- n identical patients
- GPC chooses achievement $y \in [0,1]$
  - assume n large $\rightarrow$ negligible noise in y
- GPC utility:

$$U(y) = n\rho(y) + n\theta y - n\lambda y^2$$

- Financial Return (observed)
- Cost function $\theta y - \lambda y^2$. Our interpretation:
  - Non-financial return (expect to estimate $\theta > 0$ to explain $y > \bar{y}$)
  - Direct Costs

Simplified model: 2 tasks

- Achievement $y = (y_1, y_2)$
- Number of patients n_1, n_2
- GPC utility:

$$
\begin{aligned}
U(y) = & n_1 \rho_1(y_1) + n_2 \rho_2(y_2) \\
& + n_1 \theta_1 y_1 + n_2 \theta_2 y_2 \\
& - n_1 \lambda_1 y_1^2 - n_2 \lambda_2 y_2^2 \\
& - 2(n_1 + n_2) \lambda_{12} y_1 y_2
\end{aligned}
$$

- We now add Complementarities
  - $\lambda_{12} > 0$: tasks are "substitutes"
  - $\lambda_{12} < 0$: tasks are "complements"

Many tasks ($J > 2$)

- Achievement $y = (y_1, \ldots y_j, \ldots, y_J)$
- GPC utility
$$U(y) = \sum_j n_j \left(\rho_j(y_j) + \theta_j y_j\right) - y \Lambda y^T$$
where
$$\Lambda = \begin{bmatrix} n_1\lambda_1 & n_2\lambda_{12} & \cdots & n_J\lambda_{1J} \\ n_1\lambda_{12} & n_2\lambda_2 & & \\ \vdots & & \ddots & \\ n_1\lambda_{1J} & n_2\lambda_{2J} & & n_J\lambda_J \end{bmatrix}$$
- Model implies constant returns to scale
- We assume that GPCs
  - are homogeneous in λ_j and $\lambda_{j,j'}$
  - data rationalized by heterogeneity in θ_j

Roadmap

Variation

- Exogenous variation in aggregate incentives (changes in $\underline{y}, \overline{y}, \alpha$ over time)
- Variation patient composition ($\approx$ shift-share instrument):
  - Clinic A: 90 diabetics, 10 asthmatics
  - Clinic B: 10 diabetics, 90 asthmatics
  - Suppose payments rewarding diabetics health $\uparrow\uparrow$
    - this incentive is most important for A
  - Compare asthmatic patients in A vs. B
  - If asthmatics health improves more in A, diabetes and asthma care are complements

Endogenous patient composition

- Patient might select into "high quality" (high θ) practices [Brown et al., 2023]
- Solution: BLP to recover unobserved GPC quality ξ $\rightarrow$ let θ depend on ξ
- Utility of patient p, with illness j, in location ℓ, for GPC i in year t:

$$u_{pi\ell jt} = -\eta_j \log(z_{i\ell}) + \mu_j' x_{it} + \xi_{ijt} + \varepsilon_{pij\ell t}$$

- Logit market shares $P_{ij\ell t}$
- IV: exogenous distance $z_{i\ell}$ from location ℓ to GPC i Details
- If $\psi_{t\ell j}$ is (imputed) prevalence of illness j in location ℓ, observed number of patients is

$$n_{ijt} = \sum_{\ell} \psi_{t\ell j} P_{ij\ell t}$$

- We find ξ_{ijt} is indeed correlated with y_{ijt} (i.e., choice affected by quality) Details
- In sum, the identifying assumption is: $n_{ijt} \perp \theta_{ijt}$ but only conditional on x_{it}, ξ_{ijt}

Distribution of unobservables

- We prove that Λ and $F(\theta \mid x_{it}, \xi_{ijt})$ are separately identified
- We parameterize

$$\theta_{itj} = \gamma_j^1 x_{it} + \gamma_j^2 \xi_{ijt} + \omega_i \zeta_{it} + \sigma_j \nu_{ijt}, \qquad \zeta_{it} \sim \mathcal{N}(0,1), \nu_{ijt} \sim \mathcal{N}(0,1)$$

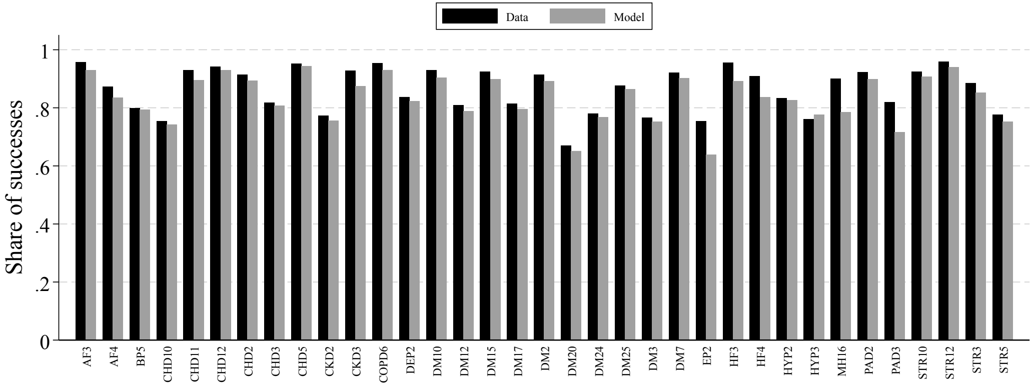
- Allows for correlation in θ_{itj} within GPC (via a simple factor structure, ζ_{it})

Estimation

- Assume observed y_{ijt} is optimal (up to integers)
- $\frac{\partial U_{it}}{\partial y_{ijt}}$ is linear in θ_{ijt}
- Intuition: analytical likelihood for θ_{ijt} is similar to a Tobit
    - First-order conditions holds for "interior" y
    - Inequalities hold if bunching at $y = \overline{y}$ or $y = 1$ Details
- Integrate numerically over ζ_{it}

Roadmap

Goodness of Fit: average achievement



Cost Matrix Λ

- Most indicators are complements (yellow / blue)

In those patients with Atrial Fibrillation in whom re is a record of a CHADS2 score of 1 (latest in preceding 15 months), % of patients who are ly treated with anti-coagulation drug rapy or an anti-platelet rapy.																																			
In those patients with Atrial Fibrillation whose latest record of a CHADS2 score is greater than 1, % of patients who are ly treated with anti-coagulation drug rapy	3.03																																		
% of patients with hypertension in whom last blood pressure (measured in previous 9 months) is 150/90 or less.	0.21	0.00																																	
% of patients with coronary heart disease who are ly treated with a beta blocker (unless a contraindication or side -effects are recorded).	1.36	-0.10	-1.52																																
% of patients with coronary heart disease in whom last blood pressure reading (measured in previous 15 months) is 150/90 or less.	-0.17	0.51	-7.48	-6.10																															
% of patients with coronary heart disease whose last measured total cholesterol (measured in previous 15 months) is 5mmol/l or less.	-1.94	0.21	-4.14	-6.43	-7.47																														
% of patients with coronary heart disease with a record in preceding 12 months that aspirin, an alternative anti-platelet rapy, or an anti-coagulant is being taken	0.98	0.53	-0.78	-5.70	-15.66	-4.26																													
% of patients with a history of myocardial infarction (from 1 April 2011) ly treated with an ACE inhibitor (or ARB if ACE intolerant), aspirin or an alternative anti-platelet rapy, beta-blocker and statin	0.45	0.87	-0.19	0.10	-0.43	0.26	-0.92																												
% of patients with coronary heart disease who have had influenza immunisation in preceding 1 September to 31 March	-0.65	-1.87	-0.53	-2.55	-16.11	-5.89	-13.72	1.21																											
% of patients on CKD register in whom last blood pressure reading, measured in previous 15 months, is 140/85 or less.	-1.86	0.63	1.85	-2.49	-1.75	-3.31	0.92	0.12	-1.17																										
% of patients on CKD register with hypertension and proteinuria who are treat ed with an angiotensin converting enzyme inhibitor (ACE-I) or angiotensin receptor blocker (ARB) (unless a contraindication or side effects are recorded).	0.18	-0.18	-0.21	0.88	-0.71	1.30	-0.98	-1.02	1.08	0.00																									
% of patients with COPD who have had influenza immunisation in preceding 1 September to 31 March.	-0.78	-0.14	0.54	-1.29	-1.74	1.00	0.86	0.06	-3.33	-0.20	0.10																								
% of patients aged 18 or over with a new diagnosis of depression in preceding 1 April to 31 March, who have been reviewed not earlier than 10 days after and not later than 56 days after date of diagnosis	-0.24	0.72			0.78	-1.66	-0.12	-0.39	0.52	0.04	-0.10	0.17																							
% of patients with diabetes in whom last HbA1c is 10 or less (or equivalent test/reference range depending on local laboratory) in previous 15 months.	1.74		-5.96	1.01	0.08	-1.49	0.55	0.48	2.22	1.42	0.85	3.70																							
% of patients with diabetes, on register, in whom last IFCC-HbA1c is 64 mmol/mol or less in preceding 12 months	1.00	1.23	-4.58	0.29	0.87	-0.42	0.62	0.43	0.82	-1.00	1.33	1.12	-0.50																						
% of patients with diabetes in whom last HbA1c is 9 or less (or equivalent test/reference range depending on local laboratory) in previous 15 months.	0.87	1.07	-3.71	0.73	0.35	0.03	-0.36	-0.02	1.36	1.40	-0.07	2.26	-0.10		-28.3																				
% of patients with diabetes in whom last blood pressure is 145/85 or less.	0.36		-6.91	-0.37	-3.06	1.47	-0.25	-0.44	5.09	-2.75	-0.14	0.31		-0.86	0.71	-2.11																			
% of patients with diabetes who have had influenza immunisation in preceding 1 September to 31 March.	-0.04	0.30	-0.15	-0.63	2.76	2.93	2.43	-0.42	-11.60	0.78	-0.69	-1.90	-0.27	-2.65	-0.19	-2.88	-5.49																		
% of patients with diabetes in whom last blood pressure is 150/90 or less.	0.43	0.39	-3.59	-2.03	-1.07	1.31	1.32	0.40	2.91	0.12	-0.01	1.03	-0.03		1.99	-1.26		-4.06																	
% of patients with diabetes, on register, in whom last blood pressure reading (measured in preceding 12 months) is 140/80 mmHg or less	0.63	-0.54	-2.53	0.45	-3.25	3.06	-2.19	-0.22	1.74	-3.82	0.12	0.01	-0.06		-1.05	0.31		-0.91	-21.00																
% of patients with diabetes whose last measured total cholesterol within preceding 15 months is 5mmol/l or less	-1.09	-0.98	-0.35	-0.70	1.28	-4.55	-1.70	0.27	3.69	0.19	-0.01	-0.61	0.36	-7.33	-2.98	-5.63	-7.57	-5.26	-1.60	-5.01															
% of patients with diabetes, on register, with a diagnosis of nephropathy (clinical proteinuria) or micro-albuminuria who are ly treated with an ACE-I (or ARBs)	0.35	0.13	-0.19	0.13	0.46	-0.30	-0.25	0.17	0.15	0.06	-0.59	0.06	-0.17	0.44	0.09	0.35	0.02	-0.42	0.16	-0.13	0.02														
% of patients with diabetes in whom last HbA1c is 7 or less (or equivalent test/reference range depending on local laboratory) in previous 15 months.	-2.18	-1.26	-5.91	1.05	-0.91	0.12	-2.28	-0.36	0.34	-1.06	-0.51	-2.10	0.84	-10.27	-17.03	-8.18	3.29	-1.09	-6.27	-1.58	-7.50	-0.06													
% of patients age 18 and over on drug treatment for epilepsy who have been seizure free for last 12 months recorded in previous 15 months.	-4.84	0.30	-0.30	1.83	-0.29	-0.57	0.17	0.22	-0.26	-3.81	-0.88	-1.87	0.53	0.30	-0.85	1.15	0.90	-1.00	2.73	-1.64	0.52	0.50	-0.68												
% of patients with a diagnosis of heart failure due to Left Ventricular Dysfunction (LVD) who are ly treated with an ACE inhibitor or Angiotensin Receptor Blocker (ARB) , who can tolerate rapy with no contra -i	-1.44	-0.37	-0.57	1.52	0.63	-3.36	-1.99	-0.34	0.26	0.08	0.01	-0.50	0.14	-0.24	-0.51	2.15	-0.61	-0.85	-0.89	0.11	-0.31	-0.66	1.57	-0.61											
% of patients with heart failure due to LVD who are ly treated with an ACE inhibitor or Angiotensin Receptor Blocker, who are additionally treated with a beta -blocker licensed for heart failure, or recorde	-1.11	-1.44	0.02	-0.86	-0.06	0.14	0.68	-0.29	0.80	0.12	-1.72	-0.76	-0.38		0.02	0.36	0.45	-0.49	0.24	-0.46	-0.95	0.31	1.07	1.45	-12.40										
% of patients with hypertension in whom last blood pressure reading (measured in preceding 9 months) is 150/90 mmHg or less	-0.37	-0.39			-8.55	0.06	-2.21	-0.21	-2.38	-1.50	-0.06	-0.46	-0.24		-4.56	-2.96		0.48	-1.77	-3.19	-1.99	-0.18	-7.21	0.74	-0.71	-0.03									
% of patients aged 79 or under with hypertension in whom last blood pressure reading (measured in preceding 9 months) is 140/90 mmHg or less	0.97	0.04			3.37	-4.89	1.72	0.05	2.37	2.54	-0.14	1.55	0.08		1.15	0.57		-0.73	-1.76	-0.67	2.87	0.01	0.69	-2.17	1.05	-0.14	-3.79								
% of women with schizophrenia, bipolar affective disorder and or psychoses whose notes record that a cervical screening test has been preformed in preceding 5 years.	-0.46	-1.43	-0.20	0.52	0.83	-0.70	0.80	0.92	0.02	-0.25	-1.43	-0.92			1.08	-0.30		-0.54	-1.66	0.55	1.00	0.05	-0.42	0.70	-0.71	1.84									
% of patients with peripheral arterial disease in whom last blood pressure reading (measured in preceding 15 months) is 150/90 or less	3.10	-0.16	-0.28	0.22	-2.53	0.81	1.84	0.58	0.14	-0.63	-0.27	0.18	-0.24		1.48	1.68		0.17	0.19	-1.86	-0.39	0.03	-1.30	-0.41	-4.86	-1.09	-0.22	-0.03	-0.11						
% of patients with peripheral arterial disease in whom last measured total cholesterol (measured in preceding 15 months) is 5.0mmol/l or less	3.48	-0.94	0.41	2.57	-0.29	-4.30	0.66	-0.82	0.53	-1.06	0.56	-1.33	0.38		0.00	-0.96		0.21	0.42	0.20	-0.01	0.73	-0.38	-0.62	5.24	1.45	2.52	-2.36	0.58	-2.62					
% of patients with peripheral arterial disease with a record in preceding 15 months that aspirin or an alternative anti-platelet is being taken	0.49	-0.10	0.06	-0.97	1.46	1.05	-2.32	0.16	0.96	-0.39	0.30	-1.68	-0.76		0.62	0.99		-0.55	0.68	-0.68	-0.17	-0.09	-1.21	0.56	-1.84	-0.90	-0.13	-0.05	0.18	-12.56	-1.34				
% of patients with a history of TIA or stroke in whom last blood pressure reading (measured in previous 15 months) is 150/90 or less.	-1.55	-0.53	-0.29	0.86	-8.41	1.06	2.30	0.58	3.87	-0.29	0.85	-0.77	-0.85	0.66	0.25	0.64	-1.28	0.52	-0.19	-0.35	0.22	-0.14	-0.92	1.07	0.78	-0.09	-0.53	0.46	-1.27	-0.68	-0.36	0.47			
% of patients with a stroke shown to be non-haemorrhagic, or a history of TIA, who have a record that an anti-platelet	-1.77	-4.77	0.01	-0.21	1.89	2.40	-3.86	0.41	1.69	-0.07	-0.23	-0.95	-0.91	1.08	1.07	0.38	-0.61	0.47	0.48	-0.87	-0.48	0.19	-1.01	-3.96	2.28	-0.61	0.16	0.35	0.57	1.79	1.30	-0.91	-5.10		
% of patients with TIA or stroke whose last measured total cholesterol (measured in preceding 15 months) is 5 mmol/l or less	-3.15	1.55	0.16	-1.58	1.54	-8.90	1.94	-0.75	1.90	-3.48	-2.36	-1.98	5.50	0.63	0.07	0.58	2.77	-0.59	0.66	2.23	-2.69	0.05	0.73	2.60	0.81	-0.53	3.19	-3.95	0.23	-0.46	-4.32	-1.38	-5.84	-4.45	
% of patients with TIA or stroke who have had influenza immunisation in preceding 1 September to 31 March.	0.55	-1.13	-0.48	1.65	3.61	1.37	2.77	-0.47	-10.68	-0.21	0.57	-1.57	-0.50	0.90	0.20	0.63	0.95	-1.80	0.59	0.43	0.71	0.00	-0.29	1.41	1.94	0.50	-0.50	0.43	0.57	-0.58	-0.21	-0.10	-13.61	-8.44	-5.30

Roadmap

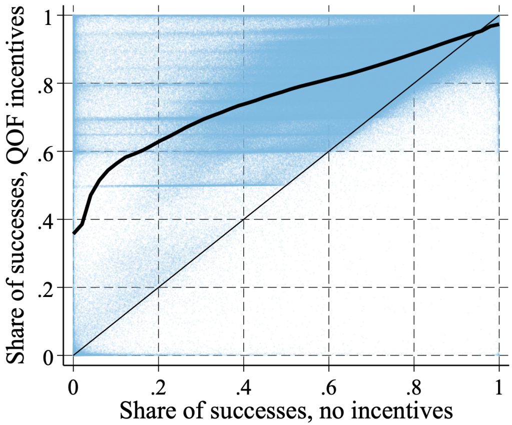
Payer's objective

- b_j are health benefits net of medical costs for indicator j
  - observed, in £, from NICE guidelines
  - known only for 20 indicators (out of 40)
- Payer's objective is

$$W = \sum_{i,j,t} n_{ijt} \int \left(y^{\star}_{ijt} b_j - \rho_{jt} \left(y_{ijt} \right) \right) f \left(\theta_{ijt} \right) d\theta_{ijt}$$

where $y^{\star}_{ijt}$ is optimally chosen by GPCs and depends on incentives $\rho_{jt}(\cdot)$ chosen by the payer.

Shutting Down QOF: achievement



- Payer's objective drops by 5%

Optimal incentive design

- Fix $\underline{y_j}$ and set $\overline{y_j} = 1$
- Choose slopes $\alpha = (\alpha_1, \alpha_2, \dots)$ to maximize the payer's objective W
- Computational feasibility: we k-means cluster GPCs into 20 groups by x_i, ξ_i, n_{ijt}
  - Maximize approximate W.
  - At the solution, compute outcomes for all GPCs

Optimal incentives

	No QOF Δ from QOF	QOF	Optimized QOF Δ from QOF
Practice payoffs	-348 -11%	3,240	164 5%
QOF payments	-353 -100%	353	199 56%
Medical costs	-1,431 -3%	43,189	683 2%
Health benefits	-5,553 -4%	131,565	3,857 3%
Welfare	-4,117 -5%	91,264	3,139 3%

- Shutting down QOF: payer's objective $\downarrow\downarrow$ by 5%
- Optimizing the QOF: payer's objective $\uparrow\uparrow$ by 3%

Roadmap

Conclusion

- Empirically tractable principal-agent model with multitasking
- Sufficient conditions for identification relying on variation in exposure to different tasks
- Apply model to QOF program in England
- Ample evidence of response to incentives and multitasking
- Model allows counterfactuals:
  - Program generates large welfare gains
  - Scope for optimization of incentives accounting for multitasking

Thank you!

a.veiga@imperial.ac.uk

Additional slides:

Literature

- Empirical models of multitasking: Slade [1996], Buser and Peter [2012], Hong, Hossain, List, and Tanaka [2018], Goes, Ilk, Lin, and Zhao [2018], Manthei and Sliwka [2019], Rodríguez-Lesmes and Vera-Hernández [2021], Kim, Sudhir, and Uetake [2022], Dinerstein and Opper [2022]
  - We go beyond testing.
  - We quantify complementarities → can consider counterfactual designs
- Pay-for-performance in healthcare: Gaynor et al. [2004], Dumont et al. [2008], Mullen et al. [2010], Choné and Ma [2011], Clemens and Gottlieb [2014], Li et al. [2014], Einav et al. [2018], Gupta [2021], Rodríguez-Lesmes and Vera-Hernández [2021], Einav et al. [2022], Gaynor et al. [2023], Dunn et al. [2024], Shi [2024, and many more]
  - We incorporate multitasking
  - We focus on primary care in non-US context

Analytic MLE

- For instance, in the 2D case:
$$\frac{\partial U}{\partial y_1} = n_1 \rho_1'(y_1) + n_1 \theta_1 - 2 n_1 \lambda_1 y_1 - (n_1 + n_2) \lambda_{12} y_2$$
- If data is $y_1 = 1$, and knowing $\rho_1'(1) = 0$, then
$$\frac{\partial U}{\partial y_1} |_{y_1=1} \geq 0 \Leftrightarrow \theta_1 \geq 2\lambda_1 + \frac{n_1 + n_2}{n_1} \lambda_{12} y_2$$
- If $y_1 \in (\overline{y_1}, 1)$, the FOC holds, so
$$\frac{\partial U}{\partial y_1} = 0 \Leftrightarrow \theta_1 = 2\lambda_1 y_1 + \frac{n_1 + n_2}{n_1} \lambda_{12} y_2 - \rho_1'(y_1)$$
- Bunching: $y_1 = \overline{Y_1}$. This implies
$$n_1 \rho_1'\left(\overline{Y_1}\right) + n_1 \theta_1 - 2 n_1 \lambda_1 \overline{Y_1} - (n_1 + n_2) \lambda_{12} y_2 \geq 0$$

$$n_1 \theta_1 - 2 n_1 \lambda_1 \overline{Y_1} - (n_1 + n_2) \lambda_{12} y_2 \leq 0$$

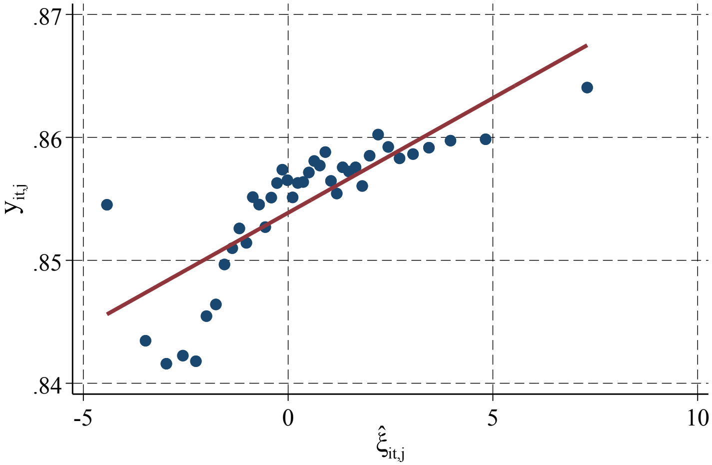
Back

Summary Reduced Form

	Extra achievement indicator j (mean = 0.43, std = 0.11)				
	OLS	OLS	OLS	OLS	IV
Payment per patient	0.117	0.278	0.302	0.289	0.24
(std = 0.09)	(0.001)	(0.003)	(0.003)	(0.004)	(0.004)
Share of patients		−0.541	−0.443	−0.425	0.084
(std = 0.04)		(0.009)	(0.008)	(0.009)	(0.011)
Share of patients × payment per patient		3.008	1.62	1.684	3.152
(std = 0.004)		(0.091)	(0.089)	(0.091)	(0.109)
Controls			Yes	Yes	Yes
FE		Ind.	Ind., Practice	Ind., Practice	Ind., Practice
R-squared	0.012	0.285	0.362	0.363	-
Observations	2145595	2145595	2145595	2014257	2005257

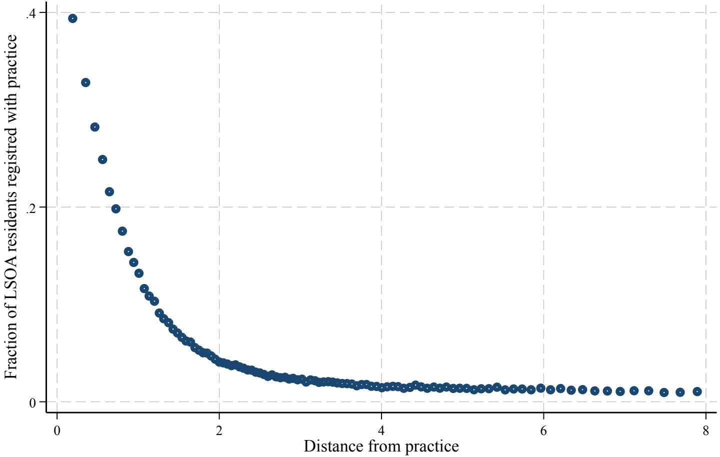
Back

Demand residual is correlated with achievement



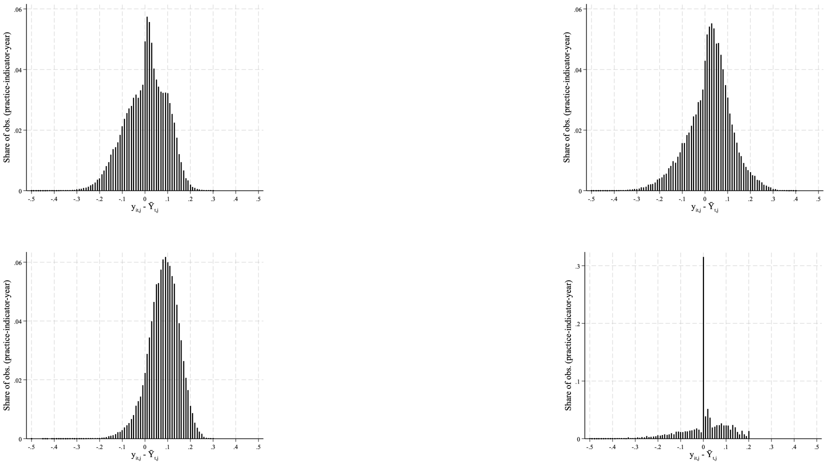
◂ Back

Distance shifts demand



◂ Back

Practices respond to incentives: heterogeneity



Back

References

Zach Y Brown, Christopher Hansman, Jordan Keener, and Andre F Veiga. Information and disparities in health care quality: Evidence from gp choice in england. Technical report, National Bureau of Economic Research, 2023.

Thomas Buser and Noemi Peter. Multitasking. *Experimental economics*, 15(4):641–655, 2012.

Philippe Choné and Ching-to Albert Ma. Optimal health care contract under physician agency. *Annals of Economics and Statistics/Annales d'Économie et de Statistique*, pages 229–256, 2011.

Jeffrey Clemens and Joshua D Gottlieb. Do physicians' financial incentives affect medical treatment and patient health? *American Economic Review*, 104(4):1320–1349, 2014.

Michael Dinerstein and Isaac M Opper. Screening with multitasking: Theory and empirical evidence from teacher tenure reform. Technical report, National Bureau of Economic Research, 2022.

Etienne Dumont, Bernard Fortin, Nicolas Jacquemet, and Bruce Shearer. Physiciansâ multitasking and incentives: Empirical evidence from a natural experiment. *Journal of health economics*, 27(6):1436–1450, 2008.

Abe Dunn, Joshua D Gottlieb, Adam Hale Shapiro, Daniel J Sonnenstuhl, and Pietro Tebaldi. A denial a day keeps the doctor away. *The Quarterly Journal of Economics*, 139(1):187–233, 2024.

Liran Einav, Amy Finkelstein, and Neale Mahoney. Provider incentives and healthcare costs: Evidence from long-term care hospitals. *Econometrica*, 86(6):2161–2219, 2018.

Liran Einav, Amy Finkelstein, Yunan Ji, and Neale Mahoney. Voluntary regulation: Evidence from medicare payment reform. *The quarterly journal of economics*, 137(1):565–618, 2022.

Martin Gaynor, James B Rebitzer, and Lowell J Taylor. Physician incentives in health maintenance organizations. *Journal of Political Economy*, 112(4):915–931, 2004.

Martin Gaynor, Nirav Mehta, and Seth Richards-Shubik. Optimal contracting with altruistic agents: Medicare payments for dialysis drugs. *American Economic Review*, 113(6):1530–1571, 2023.

Paulo B Goes, Noyan Ilk, Mingfeng Lin, and J Leon Zhao. When more is less: Field evidence on unintended consequences of multitasking. *Management Science*, 64(7):3033–3054, 2018.

Atul Gupta. Impacts of performance pay for hospitals: The readmissions reduction program. *American Economic Review*, 111(4):1241–1283, 2021.

Bengt Holmstrom and Paul Milgrom. Multitask principal–agent analyses: Incentive contracts, asset ownership, and job design. *The Journal of Law, Economics, and Organization*, 7(special_issue):24–52, 1991.

Fuhai Hong, Tanjim Hossain, John A List, and Migiwa Tanaka. Testing the theory of multitasking: Evidence from a natural field experiment in chinese factories. *International Economic Review*, 59(2):511–536, 2018.

Minkyung Kim, K Sudhir, and Kosuke Uetake. A structural model of a multitasking salesforce: Incentives, private information, and job design. *Management Science*, 68(6):4602–4630, 2022.

Jinhu Li, Jeremiah Hurley, Philip DeCicca, and Gioia Buckley. Physician response to pay-for-performance: Evidence from a natural experiment. *Health economics*, 23(8):962–978, 2014.

Kathrin Manthei and Dirk Sliwka. Multitasking and subjective performance evaluations: Theory and evidence from a field experiment in a bank.