Blended primary payment models and fee codes inside and outside the capitated basket

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ABSTRACT

**** Preliminary and not for distribution ****

Background:

The traditional 100% fee-for-service (FFS) payment model provides incentives for physicians to over-provide services, while the pure capitation payment model provides incentives for them to under-provide services. Ontario's blended capitation model, which combines a 15% fee-forservice payment for services inside the basket, 100% fee-for-service payments for services outside the basket and capitation for services inside the basket, is designed to offset these opposite forces by reducing the over-provision of care, but not to insufficient levels. The economic theory predicts that physicians in the blended capitation model are incentivized to reduce services inside the basket, and shift some of their provision to services outside the basket. However, there are no empirical findings in the literature to support these economic predictions.

Methods:

We analyze claims data of patients who remained enrolled with the same physician from 2006 to 2011. Our sample comprises physicians who were affiliated in the Family Health Group (FHG - which is a 100% FFS model) at the start of the study period, and either stayed in the FHG model or switched to a Family Health Organization (FHO -- a blended capitation model) before the end of the period. Using a fixed effects difference-in-differences model with propensity score matching, we compare the FFS equivalent billings of services inside the basket and outside the basket separately for FHG physicians and FHO physicians. For each of inside and outside of the basket services, we also compare the FFS equivalent billings of rostering physicians, physicians in the same group as the rostering physicians and physicians outside the group separately for FHG physicians and FHO physicians. To deal with the many zeros in our dependent variables, we adopt three solutions. First, we simply add $1 to the dependent variable for all observations in our dataset. Second, we use a two-part model. In the first step, we use a panel logit model to predict the probability that patients visit the physician; in the second step, we use a fixed effect model to estimate the impact of joining a FHO on the change of FFS-equivalent billings conditional on patients having visited the physician. Third, we aggregate patients' FFSequivalent billings at the physician's level and then estimate the fixed effects model at the level of the individual physician.

Results:

For services inside the basket, all three models suggest an approximate drop of 30% in the services provided by the rostering physicians and the physicians in the same group as the rostering physicians. Services inside of the basket provided by physicians outside of the group increase by a small percentage. For services outside the basket, all three models suggest an approximate increase of 10% in the services provided by the rostering physicians. Services inside of the basket provided both by physicians in the same group and outside the group drop by a small percentage.

Conclusions:

Our results are consistent with the economic theory prediction that physicians joining capitated models tend to reduce the provision of care inside the basket and increase the provision of care outside the basket. There are two opposing interpretations that can accompany our results. On one hand, these results could be an indication of physicians who are cost shifting: since they are remunerated only 15% of the fees paid for services inside the basket, they may provide fewer services inside the basket and more services outside the basket. On the other hand, our results could be associated with the fact that physicians make less of an effort to submit claims for services (inside the basket) that are reimbursed at 15% of the fee and more of an effort to submit claims for services (outside of the basket) that are paid at 100%.

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Motivation

- Literature: Quantity of care and risk selection, quality of care, access to care

  (Kralj and Kantarevic, 2011, 2012 & 2013; Kiran et al., 2012; Li et al., 2014; Glazier et al., 2013)

- Economic theory predicts switch from FHG (enhanced FFS) to FHO (blended capitation) likely has incentives to
  - Decrease services inside the basket by rostering GP and group
    - FFS has incentives for over-provision, and "pure" capitation incentives for under-provision
      - However, blended model attempts to find the middle ground
    - If decrease, then patients who feel underserved may seek capitated services elsewhere
  - Increase in services outside the basket provided by the rostering GP
    - Shifting, or improved access given decrease in over-provision inside the basket

FHG & FHO payment models

	Services inside the FHO basket	
	Family Health Group	Family Health Organization
Patient rostered with the GP	100% FFS + premium (CCP) for some codes	15% FFS, access bonus, capitation
Patient rostered with the GP in the same group	100% FFS	Same as above
Patient rostered with the GP outside the group	100% FFS	100% FFS, hard cap
Outside the FHO Basket		
100% FFS in all cases		

FFS: fee for service
CCP: Comprehensive Care Premium—10% FFS for 20 fee codes for FHG enrolled patients
Access bonus: 18.5% if enrolled patients receive the inside basket services only from the GP in the group
Hard cap: total inside basket billings to non-rostered patients no more than $47,500 (in 2006)

Double robust empirical strategy

- Propensity score weighting:
  - test if the comparison group (FHG) is equally comparable to the treatment group (FHO)
  - if not, weighting each physician by propensity score

- Difference-in-Differences:
  - applying weights to difference-in-differences fixed effect model

- If un-confoundedness (conditional independence assumption) is satisfied, then the treatment parameter can be interpreted as a causal impact

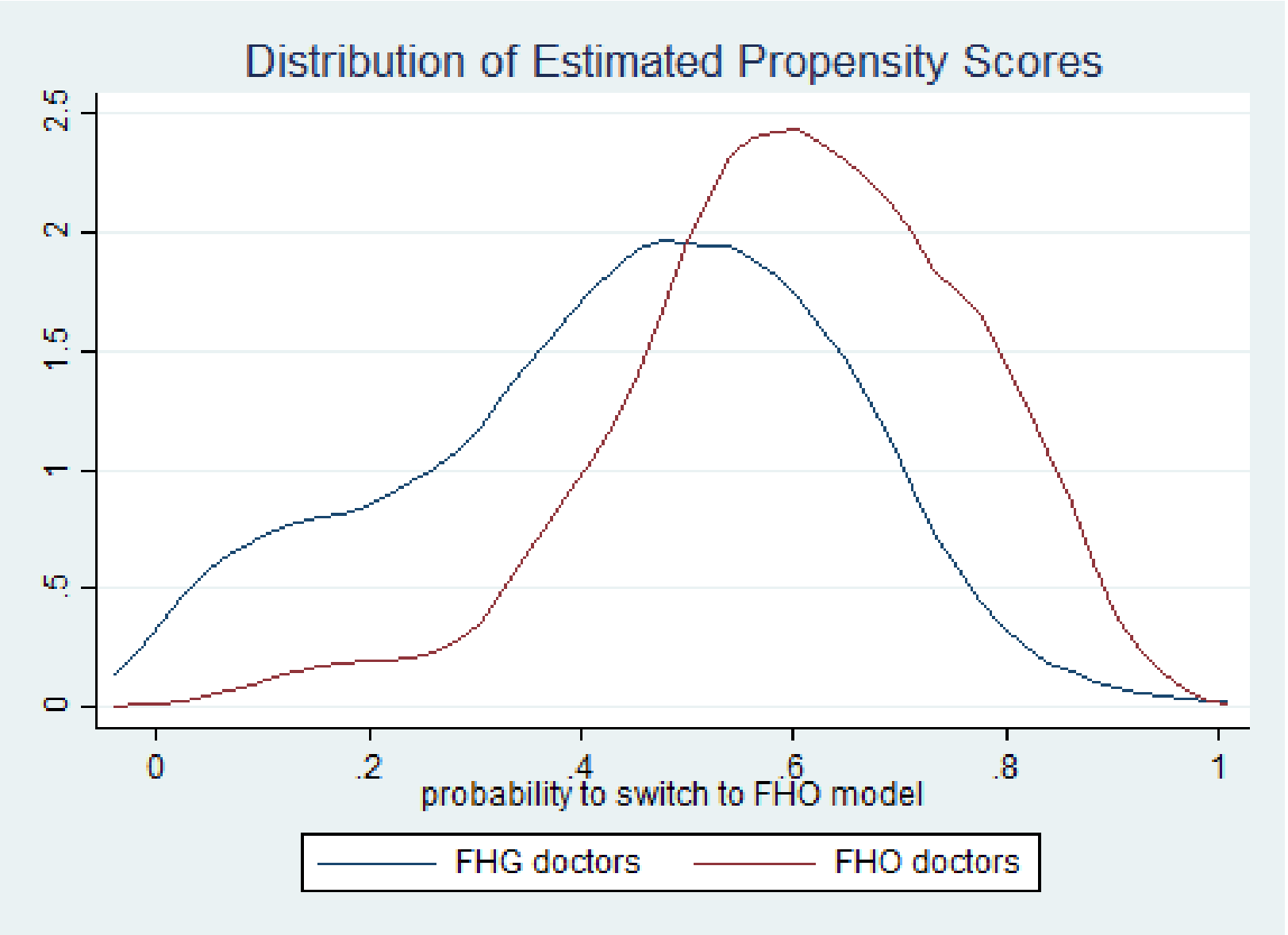
- Sample of continuously rostered patients (unless otherwise indicated)

Characteristics of physicians in 2006 before switch

	Treatment(FHO)	Comparison(FHG)	
Number of physicians	1,352	1,751	
		unweighted	**weighted**
Characteristics of physicians			
Expected income gain	23,010	-27,568***	23,045
%male	0.63	0.65***	0.60***
Age	49	51***	49
RIO (rural index of Ontario)	9	4***	9
Years of practice	19	21***	19
Characteristics of practice population			
Roster size	1,443	1,351***	1,435
%male	0.44	0.44	0.44
Age	41	41	41

Expected income gain from joining FHO: estimated by applying payment formula to physicians' actual service profile before joining FHO

Estimated propensity score distribution



Characteristics of patients in 2006

	Patients stay enrolled with the same GP during sample period 2006-2011		Patients ever enrolled with the GP in 2006	
No. of patients	2,691,709		4,243,608	
	Mean	**SE**	**Mean**	**SE**
No. of patients per GP	1210	568	1795	824
%male	0.46	0.50	0.45	0.50
Age	40	22	40	22

Distribution of patients and doctors by FHG/FHO across years

	2006/07	2007/08	2008/09	2009/10	2010/11
% patients in the FHO	0	5	25	37	47
% patients in the FHG	100	95	75	63	53
% doctors in the FHO	0	6	23	34	44
% doctors in the FHG	100	94	77	66	56

Model A: ln(FFS equivalent + $1) including zero billings

- FFS equivalent:
  - Not the actual billings, but billings if paid 100% FFS

- Adding $1 to Y for all observations
  - Data are at the level of the patient

  - : the FFS equivalent billings of patient i who is rostered with GP j in time t
  - FHO: percentage of year in which physician is affiliated with FHO
  - : individual patient fixed effects
  - : year fixed effects
  - : rostering GP characteristics
  - : patient i time varying characteristics
  - : clustered errors at doctor level

Model B: Two-part model

1) billings 0/1
2) billings | billings > 0

- 1st part---logit model:
  - $=$: latent variable

  and

  - : logistic CDF

- 2nd part---fixed effect model conditional on

- Data at the level of the patient

Model C: Aggregating to the physician level

- Aggregate billings to GP level

- $\ln(\frac{Y_{jt}}{p_n}) = \tau_j + \gamma_t + \rho\pi_{jt} + \delta FHO_{jt} + u_{jt}$

  - Y_{jt} : the billings of patients with rostering GP j in time t
  - p_n : the number of patients of rostering GP j
  - FHO: percentage of year in which physician is affiliated with FHO
  - τ_j: rostering GP j fixed effects
  - γ_t: year fixed effects
  - π_{jt}: rostering GP j's characteristics
  - u_{jt}: clustered errors at doctor level

Descriptive Statistics

- First, inside the basket
- Second, outside the basket

- For each of inside and outside the basket
  - Use two-part model format
    - Services with any GPs = services with the rostering GP
      + services with other GPs in the same group as the rostering GP
      + services with other GPs outside the group of the rostering GP

% Patients who have positive billings for services inside the FHO basket

Year	2006/07	2007/08	2008/09	2009/10	2010/11
			% patients with any GPs		
Treatment(FHO)	87	86	85	83	82
Comparison(FHG)	88	86	86	85	84
			% patients with rostering GP		
Treatment(FHO)	80	78	77	75	72
Comparison(FHG)	80	78	77	76	74
			% patients with GPs in the same group as the rostering GP		
Treatment(FHO)	18	17	15	12	11
Comparison(FHG)	19	17	17	16	15
			% patients with GPs outside the group of rostering GP		
Treatment(FHO)	29	29	30	31	31
Comparison(FHG)	32	32	32	34	34

Number of patients in a FHO: 1,271,807; number of patients in a FHG: 1,419,902

FFS equivalent billings for services inside the FHO basket conditional on positive in the year/category (per patient)

Year	2006/07	2007/08	2008/09	2009/10	2010/11
Billings with any GPs					
Treatment(FHO)	172	170	162	151	145
Comparison(FHG)	179	181	184	192	196
Billings paid to rostering GP					
Treatment(FHO)	149	148	141	130	124
Comparison(FHG)	153	154	157	163	168
Billings paid to GPs in the same group as the rostering GP					
Treatment(FHO)	54	55	51	48	45
Comparison(FHG)	57	59	61	64	66
Billings paid to GPs outside the group of rostering GP					
Treatment(FHO)	69	71	71	74	78
Comparison(FHG)	77	82	85	90	91

% Patients who have positive billings for services outside the FHO basket

Year	2006/07	2007/08	2008/09	2009/10	2010/11
% patients with any GPs					
Treatment(FHO)	36	35	35	35	35
Comparison(FHG)	37	35	35	35	35
% patients with rostering GP					
Treatment(FHO)	9	9	10	11	11
Comparison(FHG)	8	8	9	10	9
% patients with GPs in the same group as the rostering GP					
Treatment(FHO)	7	6	5	4	4
Comparison(FHG)	7	6	6	5	5
% patients with GPs outside the group of rostering GP					
Treatment(FHO)	27	26	27	26	27
Comparison(FHG)	29	27	27	26	27

Number of patients with FHO: 1,271,807; number of patients with FHG: 1,419,902

FFS equivalent billings for services outside the FHO basket conditional on positive in the year/category (per patient)

Year	2006/07	2007/08	2008/09	2009/10	2010/11
Billings with any GPs					
Treatment(FHO)	105	109	111	113	120
Comparison(FHG)	112	118	119	119	135
Billings paid to rostering GP					
Treatment(FHO)	30	31	31	37	46
Comparison(FHG)	35	35	33	35	44
Billings paid to GPs in the same group as the rostering GP					
Treatment(FHO)	58	61	59	59	63
Comparison(FHG)	56	59	58	59	61
Billings paid to GPs outside the group of rostering GP					
Treatment(FHO)	115	120	124	125	130
Comparison(FHG)	121	130	133	133	148

Regression Results

- First, inside the basket
- Second, outside the basket

Effect of joining FHO on FFS equivalent billings inside the basket

	Model A: costs including zeros	Model B: costs 0/1, then costs | costs>=1		Model C: aggregate to GP level
	Coefficient	**Marginal effect**	**Coefficient**	**Coefficient**
Log of billings with any GPs in Ontario	-0.317***	-0.031***	-0.271***	-0.273***
Log of billings with the rostering GP	-0.331***	-0.015**	-0.307***	-0.308***
Log of billings with GPs in the same group of the rostering GP	-0.204***	-0.106**	-0.266***	-0.472***
Log of billings with GPs outside the group	0.032*	0.012*	0.006	-0.025
Patients fixed effects	Yes	Yes	Yes	No
GP fixed effects	No	No	No	Yes
Year fixed effects	Yes	Yes	Yes	Yes
No. of clusters	3,103		3,102	3,103

Total number of observations: 13,491,210

Effect of joining FHO on FFS equivalent billings outside the basket

	Model A: costs including zeros	Model B: costs 0/1, then costs | costs>=1		Model C: aggregate to GP level
	Coefficient	**Marginal effect**	**Coefficient**	**Coefficient**
Log of billings with any GPs in Ontario	0.057***	0.016***	0.027***	0.017*
Log of billings with the rostering GP	0.066***	0.061***	0.136***	0.243***
Log of billings with GPs in the same group of the rostering GP	0.016	-0.008	-0.081***	-0.069***
Log of billings with GPs outside the group	0.004	0.002	-0.016*	-0.022**
Patients fixed effects	Yes	Yes	Yes	No
GP fixed effects	No	No	No	Yes
Year fixed effects	Yes	Yes	Yes	Yes
No. of clusters	3,103		3,101	3,103

Total number of observations: 13,491,210

Discussions/conclusions

- Overall quantities of services go down after joining FHO (consistent with literature)

- A physician's switch to the FHO is associated with the rostering GP and GPs in the same group reducing their provision of services inside the basket, and increasing their provision of services outside the basket
  - Multiple interpretations possible
    - Cost shifting, and improved access to non-core services/quality of care because of less over-provision
    - Less incentivized to fill in claim forms for services reimbursed at 15% and more incentivized to fill in claim forms for services fully reimbursed.
    - Causal if believe unconfoundedness (i.e., Conditional Independence Assumption) met, otherwise descriptive