Market power effects on health care workers' wages

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Abstract

Labor economists increasingly worry about the salient role that labor demand concentration might have on wages. Employing a unique dataset that covers all Colombian health-related occupations and assuming that services supply is proportional to labor demand, I calculate wages elasticity to health services supply concentration. By means of OLS and IV regressions that exploit variations in the health services provision and insurance market configuration, I show that going from three health services provider to one reduces wages by about 1.28%.

1. Introduction

Healthcare systems are yet to be designed: heterogeneity on deployment across countries has led to different analysis of how these services should be provided. A prominent issue in both developed and developing countries is coverage. Even though there has been progress towards Universal Health Coverage (UHC), country-level data tends to blur within-country inequalities. For instance, in low-income countries urban areas tend to have greater access to reproductive and maternal health services (World Health Organization, 2022). Colombia is not the exception to this situation: UHC is about 97% in urban areas, whilst in rural it can be as low as 52% (MINSALUD, 2023). Thus, the Colombian case is a good case study due to its UHC, low out-of-pocket expenses and reliable health services administrative data.

Inequalities in the access to health care provision may result from different factors. On the one hand, poverty, lack of education and lack of economic opportunities tend to determine stark differences between geographical areas (J. C. Probst et al., 2004, 2011). On the other hand, health care markets' structure also plays a role in the accessibility and quality rural patients face (J. Probst et al., 2019; Rajbangshi et al., 2017). A significant challenge policy makers face to close the gaps is the scarcity of health professionals, an issue to which Colombia is not acquitted: while OECD countries average 3.6 physicians and 8.8 nurses per every 1,000 inhabitants, Colombia accounts for 2.3 and 1.4, respectively (OECD, 2021). This gap is even worse in rural areas, where there is a lack of 1.2 physicians and 1 nurse to attain the national average. Certainly, a way of incentivizing health professionals' *migration* to less provided areas is through the wages they face in these markets. In fact, given that there's scarcity of these types of workers one should expect to see greater wages, yet lower salaries are persistent the further one moves from an urban hub.

Many factors might account for this counterintuitive fact. Whilst frictions in the labor market are usually attributed to information mismatches or mobility issues, the idea that employers have some market power has gained some momentum in the literature (Ashenfelter et al., 2022). Such a claim might be relevant to close the gap between rural and urban healthcare coverage. Considering that the Colombian rural healthcare system tends to be much more concentrated than its urban counterpart, hospitals and providers

might have *monopsonistic* power that allows them to set lower wages (Bhaskar et al., 2002). This, in turn, has an impact on the incentives health professionals must migrate to rural areas. Therefore, in this paper I answer *what is the effect of healthcare services provision concentration on health care workers' wages?*

To address the research question, I employ administrative data on health professional wages, health services provision and health insurance records. Herfindahl-Hirschman indices (HHI) are computed for both the health services industry and the health insurance industry. My approach, though similar to Marinescu's et al. (2017) and Benmelech's et al. (2022), who employ job-offerings and hired workers to address concentration respectively, differs from theirs since I analyze concentration of the market firms interact in. Hence, a key assumption of the paper is that a firm's labor demand is directly proportional to its output level, in other words, the production function of a hospital has constant returns to scale. By means of OLS regression I find that a 10% increase in concentration (Going from three services providers to a monopolist) decreases wages by about 0.89%. To address endogeneity concerns I employ IV regression that leads to qualitatively similar results, though bigger in magnitude: the same reconfiguration of the health care supply leads to wages 1.28% below the mean. My instrument is the HHI of the insurance market, which I hypothesize to have an indirect effect on wage determination. The mechanism I aim to exploit is the fact that insurer's market power allows them to contract health services providers at a lower cost, determining demand for health services, driving price-cost margins down and, finally, shifting the configuration of the provision market.

Despite gaining interest recently, the idea of market power in labor markets was first introduced by Burdett & Mortensen (1998) and later theorized by Manning (2003). In contrast to a frictionless static world, existence of *monopsonistic* power should translate into a finite labor supply elasticity, which is why many of the studies thereafter try to assess this claim. For instance, Bachmann et al., (2022) and Webber (2020) estimate firm-specific labor supply elasticities to be around 1, while Bassier et al. (2021) conclude these are around 3. Another strand of literature has approached the issue by analyzing how many other buyers of labor there are for the same workers. Marinescu et al. (2017) and Benmelech et al. (2022) compute HHI's to try to disentangle the causal effect of labor demand concentration on wages[1]. This paper is significantly closer to this branch of literature, yet some variations in the data and methods lead to different assumptions for identification.

In fact, my results entail from a bridge between Autor's et al. (2020), Barkai's (2020) and Marinescu's et al. (2017) methods: while the former two employ concentration in the product market (as I do) to conclude that it leads to a lower labor share, the latter use concentration in the labor market itself for finding an association with lower wages. Even though I dispose of wages and market shares for insurers and health services providers, data on where health professionals work is not available, which is why I do not address

[1] For a more detailed discussion and summary of the literature strands see Ashenfelter et al. (2022).

concentration from the labor side. Furthermore, a lack of hospitals returns makes impossible the computation of labor shares. I therefore aim to exploit the arguably disjointed interactions between insurers-providers and providers-health workers. Thus, my contributions are complementary to theirs. In short, I employ Autor's et al. (2020) and Barkai's (2020) *treatment* variable, product market concentration, to analyze the effects it has on Marinescu's et al. (2017) *outcome*, wages.

The rest of the paper is organized as follows. Section 2 gives a short description of the Colombian Health System and section 3 outlines potential mechanisms. Section 4 describes the data and presents summary statistics of the key variables. Section 5 discusses the empirical strategy and some interpretations, while section 6 concludes.

2. Institutional context – The Colombian Health System

Law 100 of 1993 entirely transformed the Colombian social security system and its reach, the whole system was regulated, and three key actors from the supply side were devised: the government, the insurers (EPS) and the health services providers (IPS). In a nutshell, patients attend an IPS whenever they need, say a hospital. Attentions costs are financed by the insurers, who directly pay for the services patients require, and a rather small out-of-pocket payment that depends on the patients' income level. EPSs manage the financial resources the government provides via capitation transfers. The government finances the healthcare system through payroll and general taxes. A

While there are many health services providers, there are much less insurers. On the one hand, insurers hire a network of health services providers, which limits the number and quality of places patients can attend when needing any kind of aid. On the other hand, health care providers most likely act independently from insurers since vertical integration is limited[2]. In fact, Law 1122 of 2007 introduced a barrier to vertical integration through a cap on the total expenditure of insurers, which is set to 30%. Thus, healthcare workers sign contracts with the IPS, rather than the insurers. It is therefore plausible to state that the healthcare labor market is relatively independent from the health insurance market. Nonetheless, market dominance on the insurers side must influence the market dominance of health services provision, since contracts between a big insurer affect the potential patients an IPS faces.

3. Mechanisms and hypotheses

A simple yet intuitive way to analyze the potential mechanisms underlying wage determination in highly concentrated markets in the demand side is a monopsony model as presented by Manning (2003). Consider a firm that only employs labor L to provide health services and pays a unique wage to all its workers. Its profit functions should be given by:

$$\Pi(L) = Y(L) - w(L) \cdot L \tag{1}$$

[2] Vertical integration between insurers and providers would imply that both act as a single agent in the market, that is, an insurer can add to its business the health care provision. For a more detailed discussion regarding vertical integration in the Colombian Health Care market see Bardey & Buitrago (2016).

where $Y(L)$ describes the firm's production technology and $w(L)$ corresponds to the labor supply, hence it relates the wage to a given size of the workforce L. Profit maximization leads to the first order condition:

$$0 = Y'(L) - [w(L) + w'(L) \cdot L] \leftrightarrow Y'(L) = w(L) + w'(L) \quad (2)$$

Notice that even though the marginal productivity of labor equates to the marginal cost of an extra worker, it does not equate to the wage as in a perfect competition model. In fact, market wages in equilibrium will tend to be lower since the monopsony can *markdown* the wages, as is noticeable in:

$$w^* = Y'(L) - w'(L) \cdot L \quad (3)$$

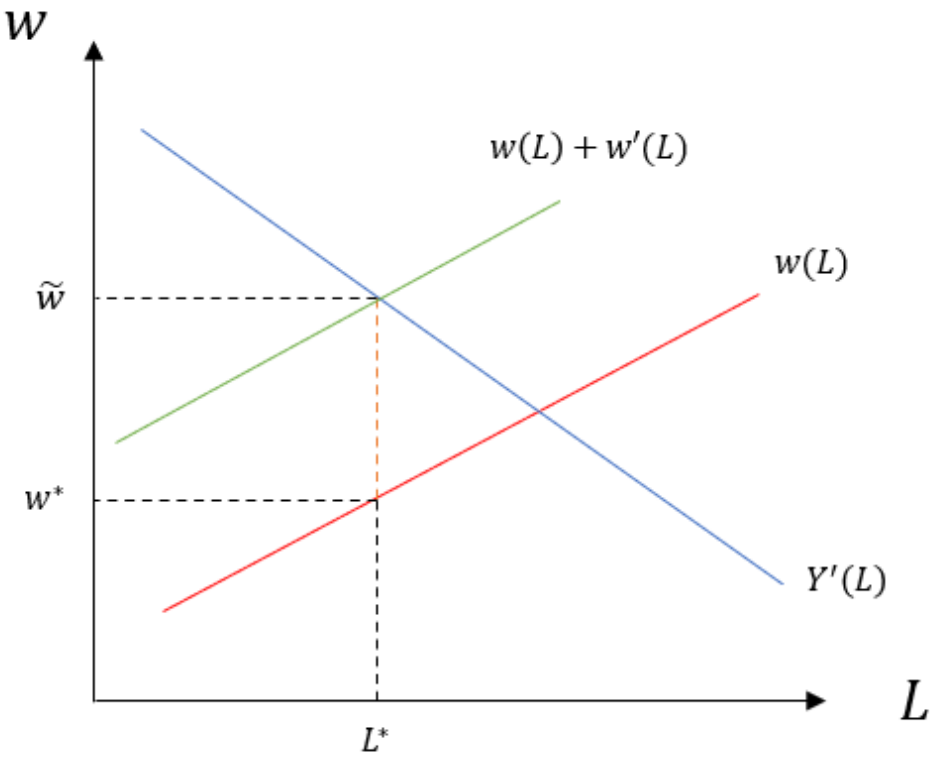
Equilibrium therefore leads to a wage that pays workers less than their marginal product, as shown in Figure 1.

4. Data[3]

The four main data sources that will be employed are RETHUS[4], which is the Colombian health professional's census; PILA[5], the social security contributions database; RIPS, the health-services provision registry; and BDUA[6], the insurance registry. As explained in (Guarin et al., 2022) RETHUS provides demographic characteristics of the health professionals, such as their age, their residence city, the type of degrees they have acquired and their graduation date. This information is presented as a cross-section at the employee-level, yet it was cast into a panel that covered 2012 through 2019. Though RETHUS gathers all occupations the Colombian government deems related to health, I drop from the sample professions as pharmaceutical chemists and microbiology, which are not necessarily directly related to health care provision. Hence, the dataset contains information for technical and professional health care workers without postgraduate degrees and that most likely are employed by a health services provider. PILA, on the other hand, provides the health care workers' monthly social security contributions, for the same years as RETHUS. The dataset contains the base on which contributions are calculated, so an average wage for each health care worker and each year is computed. I must highlight that a great share of the health care workers are *independent contractors*, so they may decide to report a lower wage than the actual one. In addition, RIPS contains the amount of health services providers supply each year. Finally, BDUA provides the number of insured patients for each EPS and throughout the years.

[3] I am deeply thankful to Banco de la República at Medellín for allowing access to the data.
[4]Acronym that translates to Healthcare Human Talent Registry.
[5] Acronym that translates to Integrated Payments Registry.
[6] Acronym that translates to Insured Unique Data Base.

Figure 1. Market equilibrium under monopsony.



Even though the monopsony hires L^*, which maximizes profits, it also can set wages w^*lower than in perfect competition, which would correspond to $\widetilde{w}$. The wedge between marginal productivity of labor and equilibrium wages expressed in equation (3) is represented by the dotted orange line.

Thus, by merging RETHUS with PILA a yearly panel at the employee-level is built, which allows to track each health professional's earnings and the city they live in. This last characteristic is extremely relevant because I aim to exploit the variation in market power at the municipality level to assess its impact on *average* health professionals' wages[7]. The panel is later collapsed at the municipality-occupation-year level. Furthermore, aiming to retrieve real wages I divide the wages by the yearly CPI, so all wages are expressed in terms of 2018 prices. To measure market concentration in both health services provision and insurance markets at the municipality-year level, I compute the HHI as:

$$HHI_{m,t} = \sum_{i \epsilon m} s_{i,t}^2 \quad (4)$$

Where $s_{i,t}$ is the market share of firm i in municipality m in year t. This is done separately for IPS's and EPS's. The market share for the former industry is therefore a function of the number of services provided by a specific firm, while for the latter it will depend on the quantity of insured patients. The interpretation of the index is straightforward: low-

[7] Different facts can account for these variations in concentration for a municipality between years: providers entry or exit can be some examples.

concentration markets will tend to 0, whilst a highly concentrated health services industry, for instance, should tend to 10,000. Figure A1 of the Appendix briefly depicts how the datasets were modified for building the main database.

Finally, though the data for all health professionals could be employed for my regressions, I prefer to analyze average wages at the municipality-occupation-year level because of the aggregation level of my concentration measurements. In addition, since I lack data on the employee-employer links, which may be related to wage setting, I prefer to analyze how concentration in a specific municipality has an effect in the overall distribution of wages rather than on each health care worker' salary.

Table 1. Providers concentration descriptives.

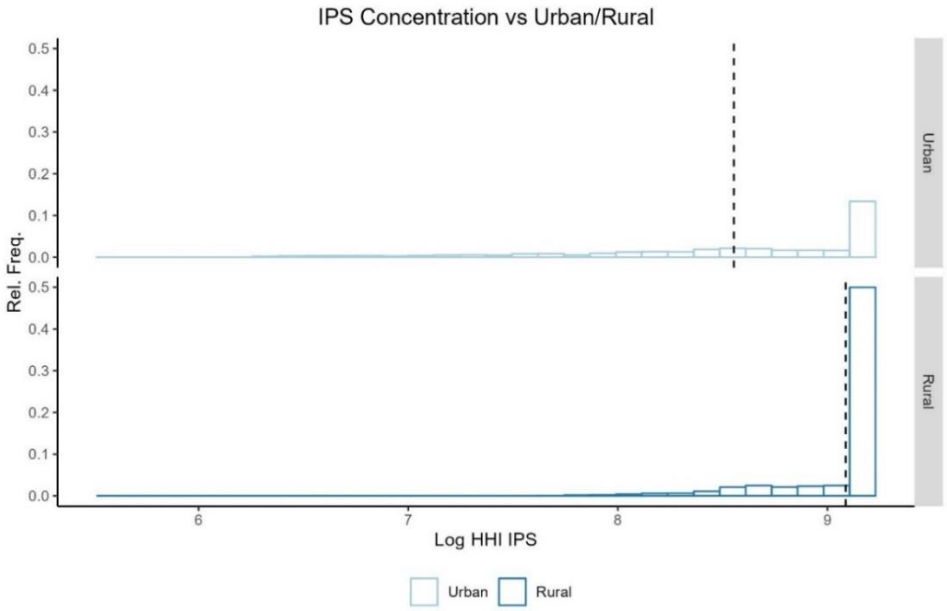
Providers descriptives			
	Median	Mean	SD
Number of IPS per muni.	2	12.87	44.21
Number of EPS per muni.	13	14.87	7.95
Log HHI IPS	8.99	8.67	0.72
Log HHI EPS	7.87	7.89	0.54

Table 1 presents statistics on number of providers and insurers as well as concentration in each market across municipalities. It is noticeable that there is substantial variation in the number of providers per municipality: some municipalities have few providers, usually smaller ones, while big cities tend to have several hospitals and clinics. The insurance market concentration is less dispersed, and it is in average less concentrated than its services provision counterpart. Moreover, part of the motivation of my paper is to understand differential dynamics in urban and rural areas since the latter tend to be underprovided. Thus, I present in Figure 2 histograms of the concentration indices for urban and rural municipalities. I classify a municipality as rural if its share of rural population is over the median municipality, out of the 781 municipalities my panel covers, 522 (66.84%) are classified as rural. The dashed lines correspond to the average concentration for the specific distribution. There are two main takeaways from these histograms (i) urban areas tend to have a lower concentration, regardless of the market one studies, and (ii) the services market is heavily skewed towards highly concentrated markets, a feature quite salient in rural municipalities since more than 50% of the sample has log-concentrations of more than 9, suggesting all health services provision is concentrated in one IPS.

Table 2, in turn, presents descriptive statistics on my outcome variable for thirty-two different occupations. The top three most representative workers are nursing auxiliaries, nurses and physicians which are protagonists of primary care. Furthermore, I must highlight that there are stark differences in the wages across occupations. Much less so within occupations, except for Physicians and Dentists, whose wages tend to be more dispersed. Differences in average wages are associated to structural differences in education

levels, their costs as well as the supply of the worker-type. Physicians earn on average almost four times more than nursing auxiliaries, and about two times more than nurses. These differences, as well as specific features of the labor markets, say minimum wages, may be associated to the degree of market power IPS can exert when setting wages, something I further discuss in my analysis.

Figure 2. IPS and EPS concentration for urban and rural municipalities.



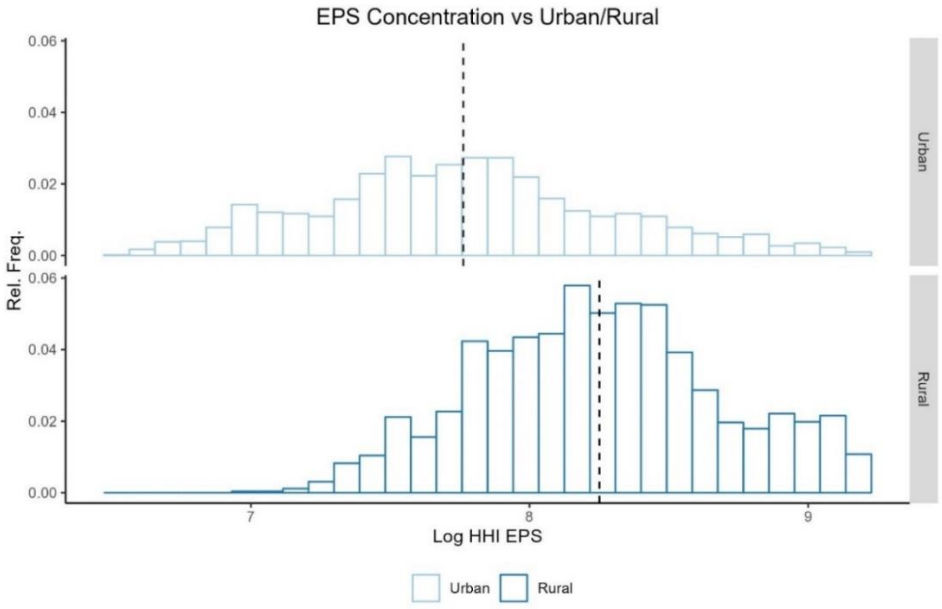


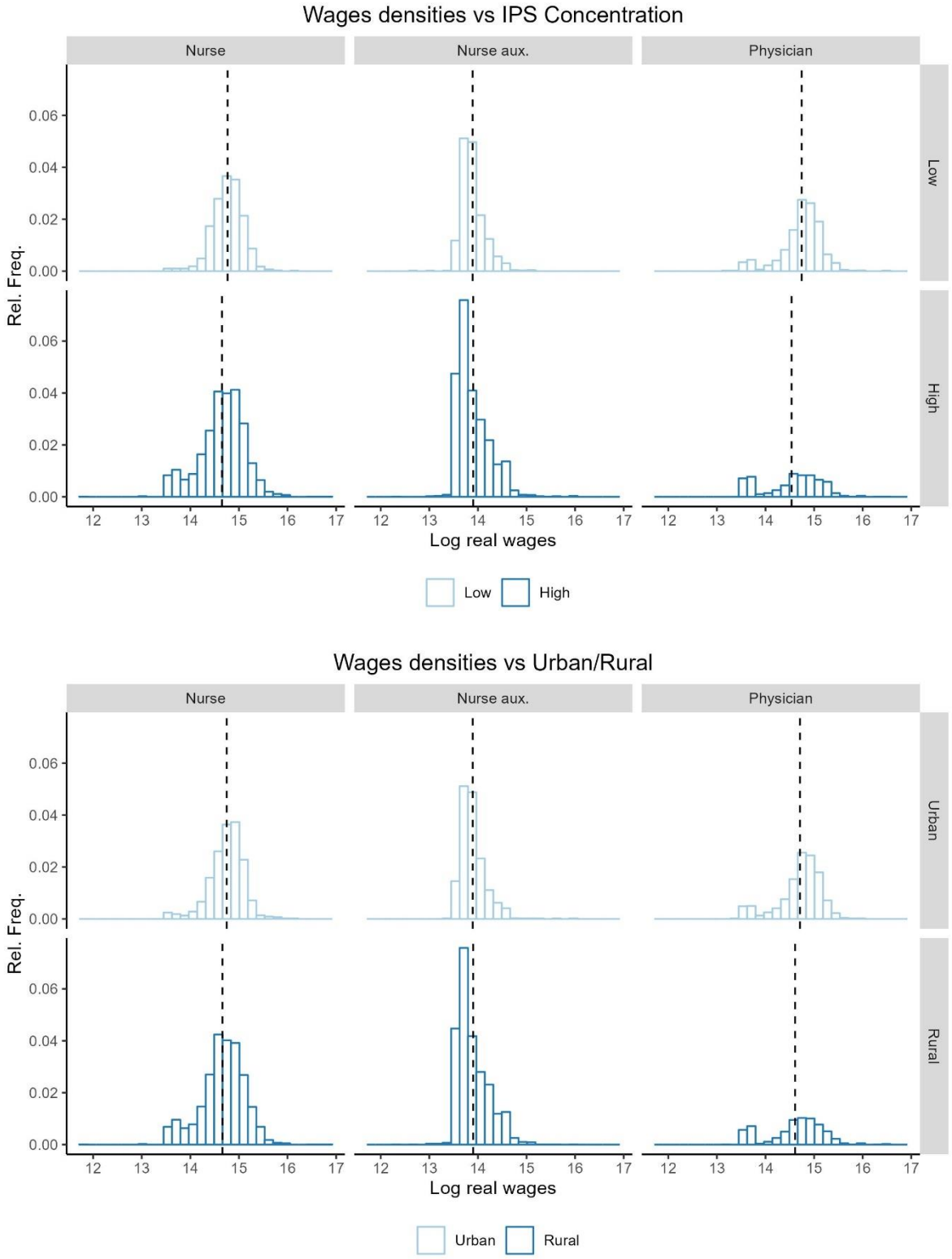
Table 2. Wages descriptives.

Occupation	Number of obs.	Median	Avg. Real Wages	SD
Nursing auxiliary	5187	1.02	1.09	0.26
Nursing	4203	2.27	2.33	0.96
Physician	4194	3.78	4.04	2.15
Psychologist	4157	1.79	1.84	0.86
Dentistry auxiliary	4152	0.91	1.01	0.39
Dentist	3798	1.9	2	1.03
Pharmacy manager	3650	1.16	1.22	0.46
Bacteriologist	3563	2.1	2.16	0.98
Other auxiliaries	3205	1.05	1.17	0.93
Physiotherapist	3138	1.56	1.62	0.79
Pharmaceutical services auxiliary	3050	0.92	1	0.4
Nutriologist	1915	2.36	2.35	1.06
Audiologist	1874	1.47	1.6	1.26
Surgical auxiliary	1848	1.72	1.84	0.86
Radiology technician	1716	1.64	1.7	0.96
Other pro. Technician	1656	1.05	1.19	0.58
Occupational therapist	1422	1.66	1.74	1.08
Public health auxiliary	1303	0.94	1.16	0.82
Optometrist	1243	1.77	1.91	1.28
Respiratory therapist	1201	1.94	2.04	1.12
Health management auxiliary	1029	0.88	1	0.47
Hospital care technician	692	1.3	1.43	0.67
Gerontology	678	1.88	2.04	1.32
Mechanical dentistry technician	646	0.8	1.18	0.7
Cytohistology technician	597	1.47	1.58	0.83
Health supervisor	591	1.85	2.05	1.35
Dentistry pro. Technician	489	0.8	0.96	0.57
Mechanical dentistry pro. Technician	457	0.83	1.17	1.18
Other technicians	354	1.61	1.88	1.6
Hospital care pro. Technician	110	1.11	1.21	0.48
Radiotherapy technician	31	2.42	2.27	1.18
Health technician	30	1.33	1.26	0.42

Wages expressed in millions of Colombian pesos. Number of observations for wages refers to the number of municipalities where there is at least one worker for the specific occupation for a specific year.

Furthermore, I present in Figure 3 histograms of the average real wages for the three main occupations of my dataset, this for urban and rural municipalities, as well as low and high IPS concentration markets. High concentration in health provision corresponds to municipalities where the log HHI is above the median. Once again, the dashed lines correspond to the average real wage for the specific distribution. While there does not seem to be a difference on nursing auxiliaries wages, something most likely linked to the fact that they do not earn much more than the minimum wage, this is not the case for nurses and physicians: these two types of health care workers tend to perceive lower wages in highly concentrated markets and in rural municipalities. Moreover, a salient feature of their distributions is their heavy left-tail, turning them bimodal. This therefore presents some suggestive evidence of lower wages for health care workers in highly concentrated IPS markets and in rural areas. However, the market power health services providers exert when setting wages may be diminished for low-earnings occupations.

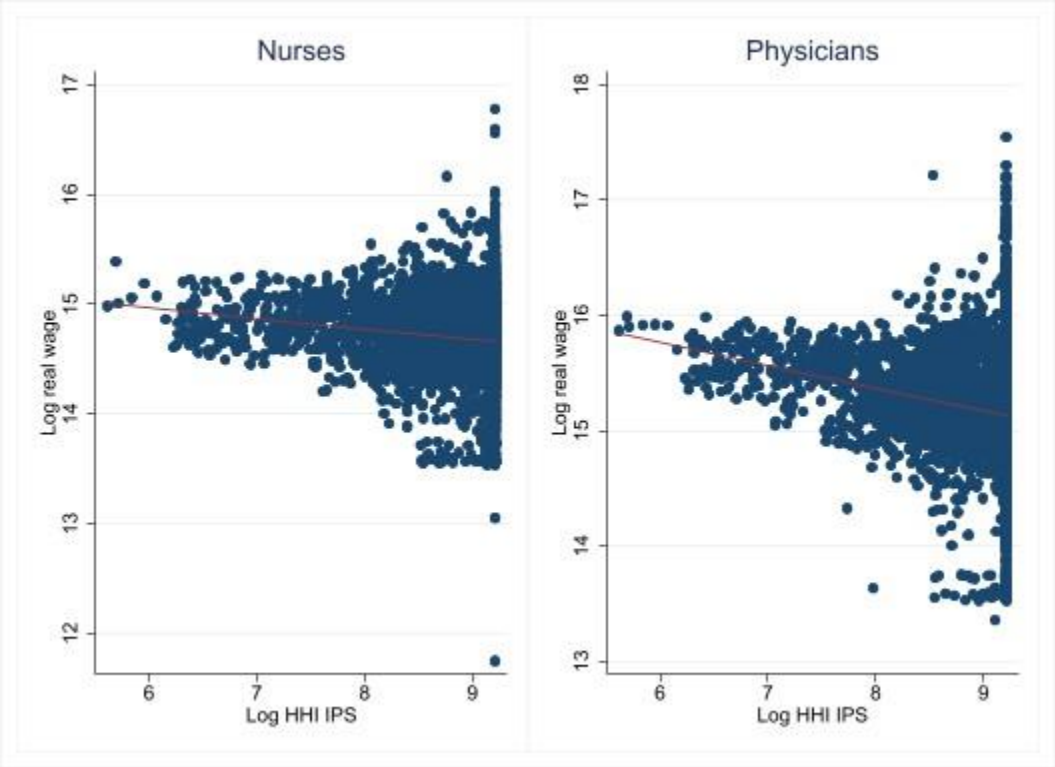
Figure 3. Average real wages densities.



Finally, Figure 4 presents a simple scatter plot with a naïve linear fit of the log of average real wages for nurses and physicians against the log of concentrations in the

services provision market, showing the relationship I argue is salient in highly concentrated markets: wages tend to be lower since providers can exploit their market power from the demand side.

Figure 4. Scatter plot of log average wages vs log HHI for IPS



5. Empirical strategy

As aforementioned, I aim to understand how a highly concentrated product market can entail lower wages. In a nutshell, my empirical strategies exploit the variation across municipalities and time in the IPS' market HHI to figure out whether *more competition* in health services provision leads to higher wages.

Ordinary Least Squares (OLS)

The first equation to be estimated through OLS is:

$$\bar{w}_{oms,t} = \beta HHI_{m,t}^{IPS} + \lambda_o + \lambda_s + \lambda_t + \delta X_{m,t} + \epsilon_{oms,t} \quad (5)$$

Where $\bar{w}_{oms,t}$ is the log of average real wages for health-related occupations in municipality m within state s in year t. These will therefore depend on the log of concentration in the IPS market in municipality m in year t. β should capture the effect of health services supply concentration on health professionals' wages. Year fixed effects help me to correct for any year-specific shocks – e.g., productivity shocks. In addition, occupation fixed effects allow me to control for structural wage differences, for instance due to education costs or degree nature (Technical vs Professional); while state fixed

effects λ_s absorb potential confounders associated to state-level labor market's nature. I prefer to employ state rather than municipality level fixed effects for two main reasons: (i) markets are typically defined at the former level, and (ii) demeaning at the municipality level leaves little variation to be explained by concentration. Moreover, aiming to tackle omitted variable bias due to municipality-year-specific characteristics, I add a set of controls in $X_{m,t}$, which includes number of murders and rural population as percentage of total population. These should control for any premiums due to violence or remoteness of the municipality. Finally, $\epsilon_{oms,t}$ is an error term that I cluster at the municipality level aiming to correct for potential autocorrelation between wages in each municipality across the years. I cluster at the municipality instead of state level following Abadie's et al., (2022) recommendation of defining the clustering level at the *regressor* level for avoiding unnecessarily conservative inference.

Instrumental variables

Identification in the previous case relies on the assumption that there is no time-varying municipality-specific variables correlated with health services provision concentration and wages, which is a quite restrictive assumption. In the spirit of Marinescu et al. (2017), I instrument $HHI_{m,t}^{IPS}$ with the log of concentration of insurers at the municipality-year level, $HHI_{m,t}^{EPS}$. Hence the first stage could be expressed as:

$$HHI_{m,t}^{IPS} = \theta HHI_{m,t}^{EPS} + \gamma_o + \gamma_s + \gamma_t + \mu X_{m,t} + \varepsilon_{m,t} \quad (6)$$

With this instrument I aim to exploit the potential effects of market power in the insurance industry that can affect concentration in the health services provision market. In a nutshell, I am instrumenting with a demand-shifter that potentially reconfigures market power in health services provision, but not necessarily is directly connected to wage determination. The intuition is straightforward: a more concentrated insurance market allows the EPSs to contract IPSs at lower prices, for the insurers can exploit their market power. This mechanism both determines the demand IPSs face and would also shrink their price-cost margins. Hence, one could expect that some providers either lose market share or that the most inefficient firms exit the market altogether. This, in turn, shifts health services provision concentration showing the indirect effect my instrument has on wages. The key assumption for identification is that there are no $HHI_{m,t}^{EPS}$ shifters that are also correlated to wage determination. Hence, a shock that both affects the configuration of the insurance market and health professionals' salary would bias the estimations.

6. Results

The first estimation of equation (5) leads to results consistent with those of Benmelech et al. (2022) and Rinz (2022), as well as those hypothesized with the simple monopsony framework. The least restrictive specification implies that going from the 25th percentile of concentration to the 75th percentile (approximately a 10% increase in concentration or going from three hospitals to a single hospital) leads to wages 0.236% below the average. column (2) controls for year-specific shocks turns the estimations even more negative, suggesting the effect in column (1) may be attenuated due to country-wide increases in real

wages across time. In general, the effect when controlling for occupation-, state- and year-specific shocks: once again, moving from three competitors for health care workers to a monopsony (All my interpretations henceforth will use this variation as reference for easier interpretation) implies wages 0.890% below the mean. Though all the estimations result are negative and depict a significant effect of concentration on wages, concerns of endogeneity are still latent hence I turn to the IV estimations.

Table 3. OLS results – Providers concentration effects on average real wages

	(1) $\overline{w}_{oms,t}$	(2) $\overline{w}_{oms,t}$	(3) $\overline{w}_{oms,t}$	(4) $\overline{w}_{oms,t}$	(5) $\overline{w}_{oms,t}$	(6) $\overline{w}_{oms,t}$	(7) $\overline{w}_{oms,t}$	(8) $\overline{w}_{oms,t}$
$HHI_{m,t}^{IPS}$	-0.0236**	-0.0469***	-0.0514***	-0.0377***	-0.0748***	-0.0611***	-0.0659***	-0.0890***
	(0.00996)	(0.00980)	(0.0104)	(0.00829)	(0.0103)	(0.00794)	(0.00840)	(0.00794)
Observations	61,711	61,711	61,711	61,711	61,711	61,711	61,711	61,711
R-squared	0.011	0.069	0.429	0.040	0.487	0.091	0.462	0.512
Year FE	No	Yes	No	No	Yes	Yes	No	Yes
Occ. FE	No	No	Yes	No	Yes	No	Yes	Yes
Dpto. FE	No	No	No	Yes	No	Yes	Yes	Yes

OLS estimations of equation (5). The dependent variable corresponds to log real wage while the independent variable is the log of the concentration index. Clustered standard errors in parentheses. Standard errors were clustered at the municipality level. Significance: *** p<0.01, ** p<0.05, * p<0.1

Firstly, I should highlight the instrument's relevance: first stage F-statistics above 10 imply a strong correlation between the insurance and health services markets concentration (Stock & Yogo, 2002). This is somehow reassuring and rules out a weak instruments issue that could bias the estimations. Furthermore, it is noticeable that regardless of the specification, the relationship between $HHI_{m,t}^{IPS}$ and $HHI_{m,t}^{EPS}$ is relatively stable: a 1% increase in concentration in the insurance market is associated with around a 0.592% increase in its health services provision counterpart. Furthermore, like Table 3 results, all the IV estimations have the expected sign, though insignificant in half of the cases. The preferred specification in column (8) of Table 4 shows significant and a higher point estimate for the effect of IPS concentration on wages. Again, going from the 25th percentile of concentration to the 75th leads to a significant reduction on wages of 1.28%. Surprisingly, this estimate is within the range that Marinescu et al. (2017)estimate to be plausibly exogeneous (between -0.177 and 0.036).

Looking to address whether there are differences between urban and rural areas, I run the most restrictive IV regression (All the fixed effects) for the urban and rural sub-samples built for Figure 2. These results are presented in Panel A of Table 5. Both regressions show a relatively strong first-stage, though less powerful for the rural areas. While urban areas have a significant point estimate, quite close to the one for the full sample in column (8) of Table 4, the result for rural is smaller and only significant at the

10% level. All in all, regardless of rurality, the point estimates suggest that market power in the product market leads to lower wages.

Table 4. IV results - Providers concentration effects on average real wages

Panel A. First stage results	(1) $HHI_{m,t}^{IPS}$	(2) $HHI_{m,t}^{IPS}$	(3) $HHI_{m,t}^{IPS}$	(4) $HHI_{m,t}^{IPS}$	(5) $HHI_{m,t}^{IPS}$	(6) $HHI_{m,t}^{IPS}$	(7) $HHI_{m,t}^{IPS}$	(8) $HHI_{m,t}^{IPS}$
$HHI_{m,t}^{EPS}$	0.496***	0.503***	0.477***	0.595***	0.485***	0.611***	0.576***	0.592***
	(0.0501)	(0.0504)	(0.0495)	(0.0479)	(0.0498)	(0.0487)	(0.0470)	(0.0478)
Observations	61,711	61,711	61,711	61,711	61,711	61,711	61,711	61,711
Year FE	No	Yes	No	No	Yes	Yes	No	Yes
Occ. FE	No	No	Yes	No	Yes	No	Yes	Yes
Dpto. FE	No	No	No	Yes	No	Yes	Yes	Yes
1st Stage F	97.92	99.78	92.75	154.73	94.59	157.61	150.25	153.11

Panel B. Second stage results	(1) $\bar{w}_{oms,t}$	(2) $\bar{w}_{oms,t}$	(3) $\bar{w}_{oms,t}$	(4) $\bar{w}_{oms,t}$	(5) $\bar{w}_{oms,t}$	(6) $\bar{w}_{oms,t}$	(7) $\bar{w}_{oms,t}$	(8) $\bar{w}_{oms,t}$
$\widehat{HHI_{m,t}^{IPS}}$	-0.0161	-0.00372	-0.0386	-0.111***	-0.0256	-0.0955***	-0.144***	-0.128***
	(0.0243)	(0.0242)	(0.0262)	(0.0189)	(0.0260)	(0.0181)	(0.0193)	(0.0184)
Observations	61,711	61,711	61,711	61,711	61,711	61,711	61,711	61,711
R-squared	0.012	0.011	0.031	0.009	0.029	0.011	0.028	0.032
Year FE	No	Yes	No	No	Yes	Yes	No	Yes
Occ. FE	No	No	Yes	No	Yes	No	Yes	Yes
Dpto. FE	No	No	No	Yes	No	Yes	Yes	Yes

IV first and second stage estimations of equation (5). The dependent variable corresponds to log real wage while the independent variable is the log of the concentration index. Clustered standard errors in parentheses. Standard errors were clustered at the municipality level. Significance: *** p<0.01, ** p<0.05, * p<0.1

Finally, I explore different point estimates across educational levels trying to understand if there is lower market power exertion on low-earning health care workers. Thus, I run the most restrictive specification for three sub samples depending on the educational attainment. The results in Panel B of Table 5 are ordered from lower to higher levels of achievement. These show significant and negative effects of IPS concentration on wages, an effect that increases the higher the academic achievement. For instance, health care workers who study shorter and cheaper programs (Auxiliaries) may expect to face wages 0.5% lower whereas those who are professionals (Nurses or Physicians, say) would face a reduction of 1.62%.

Table 5. Effects across urban, rural, and educational levels

Panel A. Second stage results for urban and rural areas	Urban	Rural
	(1)	(2)
	$\overline{w}_{oms,t}$	$\overline{w}_{oms,t}$
$\widehat{HHI}_{m,t}^{IPS}$	-0.125***	-0.115*
	(-0.0187)	(-0.064)
Observations	30,631	31,080
R-squared	0.041	0.003
Year FE	Yes	Yes
Occ. FE	Yes	Yes
Dpto. FE	Yes	Yes
1st Stage F	140.41	40.71

Panel B. Second stage results for educational levels	Auxiliary	Technical	Professional
	(1)	(2)	(3)
	$\overline{w}_{oms,t}$	$\overline{w}_{oms,t}$	$\overline{w}_{oms,t}$
$\widehat{HHI}_{m,t}^{IPS}$	-0.0586***	-0.116***	-0.162***
	(-0.0185)	(-0.0267)	(-0.0273)
Observations	17,916	9,998	33,797
R-squared	0.007	0.04	0.043
Year FE	Yes	Yes	Yes
Occ. FE	Yes	Yes	Yes
Dpto. FE	Yes	Yes	Yes
1st Stage F	154.34	141.55	148.33

IV second stage estimations of equation (5). The dependent variable corresponds to log real wage while the independent variable is the log of the concentration index. Clustered standard errors in parentheses. Standard errors were clustered at the municipality level.
Significance: *** p<0.01, ** p<0.05, * p<0.1

7. Discussion

Both the OLS and IV results show that the simple monopsony framework presented in section 3 may be in play. The significant estimates depict that markets that have three competitors and become a monopsony lead to a reduction of health care workers' wages that ranges from 0.236% to 1.62%, which is also within the range of the estimates found in the literature. Even though there does not seem to be a pronounced difference between rural and urban areas, the market power exerted by the health care providers may be more pronounced on the higher educational attainment workers, as depicted in Panel B of Table

5. A potential explanation could be linked to wages rigidity for low academic achievement workers: since they do not earn much more than the minimum wage there is little margin for reducing their earnings. On the other hand, given that more educated workers have higher salaries and that they may face significant mobility costs, the IPS can set slightly lower wages. Though significant, my estimates are still quite low since a reduction of 1.62% in the wage may not be quite sizeable when a health care worker is trying to be hired.

8. Conclusion

In this paper I contribute to the labor literature that analyzes the prominence of labor demand concentration and its negative spillovers. Both the OLS and IV results show that the simple monopsony framework presented in section 3 may be in play. The significant estimates depict that markets that have three competitors and become a monopsony lead to a reduction of health care workers' wages that ranges from 0.236% to 1.62%, which is also within the range of the estimates found in the literature. Policymakers willing to improve coverage in underprovided areas should therefore consider the role that labor demand concentration might have on wages such that proper incentives are structured. Health professionals will not be attracted to these areas if sufficiently high returns are not available in the market.

In addition, my results and methods are complementary to those of Autor et al. (2020), Barkai's (2020) and Marinescu's et al. (2017): instead of analyzing the effects of labor market concentration on wages, I do it for the concentration in the product market. Further improvements to the empirical approach could be developed. Data that linked providers with workers and providers with insurers could allow a departure from assuming that labor demand is proportional to health services supply and estimate a more tractable structural model that shed light on the mechanisms underlying the fact that product market concentration leads to firms that *markdown* wages.

9. References

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10. Appendix A

Figure A1. Brief diagram of the database construction.