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Consolidation, Quality and Economies of Scale in English General Practices

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Abstract

The market status of eighty per cent of the general practices in the NHS England, from 2013 through 2016, is recorded to explore the validity of the argument that economies of scale are the prevailing reason general practices consolidate to form larger groups. I explore the argument by employing the Comanor-Wilson minimum efficient scale index. The evidence seems to be in favour of this hypothesis, although returns to scale fade out relatively quickly. However, the latter take the form of specialization (internal) as well as external economies of scale. The perception that consolidated practices achieve higher quality scores is explored as well, to find that larger and consolidated practices perform better and are better funded.

Keywords: Healthcare, General Practice, Practice Size, Merger, Minimum Efficient Scale

JEL Classification codes: D24, G34, I18, L11, L25, L26

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Conflict of interest & Ethical consideration

The author declares that there is no conflict of interest. This study was reviewed using the University of Surrey's ethics procedures and was found to have no ethical concerns.

1. Introduction

After a long line of reforms at the secondary care level mostly, the English National Health Services (NHS) have turned the spot light on the performance improvement of the primary care sector i.e. the general practice industry (GPs), as a means to reduce secondary health costs. GPs are self-employed or salaried professionals contacted with the NHS to serve the needs of the local population. That being said, as entrepreneurs, GPs have to deal with increasing demand from the patients' side, an ageing population in need and reduced labour supply leading to reduce practice capacity. In addition practices face financial constraints affecting their ability to provide seamless care and high quality of services.

As a result during the last few years, there has been a trend for practices to join forces and form larger groups, as noted by the health columns of the press[1], (although it has been an option the last twenty years). Combining resources under consolidated groups therefore appears to be beneficial for practices in the current circumstances, a coping mechanism for practices to deal with the increasingly tougher circumstances the industry is going through.

Economic theory states that in mergers there is a set of benefits for firms to exploit such as economies of scale and scope, cost synergies, market expansion and more efficient management while the loss of independence, administrative burden, asymmetric information and conflicting interests appear to be the main expenses of it. Economies of scale appear to be the predominant argument for consolidation in primary care as health care consultancies argue. If it holds, economies of scale are exhausted in larger practice size for the consolidated, compared to the unconsolidated practices, implying that it is more likely for the former to exploit the benefits of a larger scale of operations.

Along with the returns to scale, it has also been supported that practices merge with the perception of achieving higher quality of services (Given, 1996). The Quality of Outcomes

[1] http://www.pulsetoday.co.uk/hot-topics/stop-practice-closures/sharp-rise-in-gp-mergers-as-smaller-practices-struggle-to-stay-above-water/20007879.article
http://www.aisma.org.uk/wp-content/uploads/2011/06/Practice_merger.pdf

Framework (QOF) introduced in 2004 is a voluntary, although most practices have enrolled, point system in which practices collect points over a variety of indicators. Practically, this scheme is a means to monitor and incentivize the quality of the services by rewarding best practice. Therefore, the higher the quality score achieved by the practice, the higher the payment from the NHS.

The impetus of this paper is twofold. First, I focus on evaluating the prevailing argument, from an economic and managerial angle, that general practices merge to exploit the economies of scale through a larger scale of operations and the exploitation of complementarities to increase the quality of services. The latter brings us to the second block, which is to explore the perception general practices have that being part of a practice group would promotes the quality of services.

For the time being, we can only investigate whether the above hold after consolidating using this snapshot of the primary care industry. Economic Theory does not provide for a solid theoretical model determining the drivers of primary care consolidation (horizontal or vertical) and any attempt of specifying an empirical model would suffer from omitted variables bias compromising the results. We focus on evaluating the above arguments which is of particular interest to policy makers, health researchers and consultants and leave for future research the quest to find the determinants of consolidation.

Considering the above, the main research question of this paper is *whether the argument about the exploitation of economies of scale when general practices consolidate, holds*. Framed differently, we explore if consolidated practices are associated with a larger minimum efficient scale (MES), compared to the unconsolidated ones. If this is true, then being part of a practice group leads to exploitation of economies of scale and the argument about it when joining forces with a group of practices is confirmed by the evidence.

I find that the argument holds, as the returns to scale for consolidated practices exhaust in relatively larger size, compared to the unconsolidated ones, for the period of study. Moreover, I find that the consolidated practices achieve higher (overall) quality scores and are better funded, not only compared to the unconsolidated ones but also to the average practice in the industry.

2. Methods

The ways to the MES could be either parametric or non-parametric. Regarding the former, a cost function could be specified as in Wholey et al. (1996), however that would require detailed information on prices. The intrinsic difficulty in obtaining prices, makes this approach a tough path to pursue. The latter approach could be materialized through the linear programming technique of Data Envelopment Analysis which forms a piece wise linear frontier under alternative kinds of returns to scale (increasing, decreasing, variable and constant).

Another commonly used and easy to implement way of measuring the MES is to use the Comanor-Wilson MES index (1967, 1969) using the empirical distribution of the employed labour which has been used in empirical applications in many fields in economics (Rotenberg & Saloner, 2000; Agarwal & Audretsch, 2001). In this direction, Tsekouras et al. (2009) compare the results of the Comanor-Wilson MES index with those predicted by the Data Envelopment Analysis (DEA) to find that MES index successfully predicts the returns to scale in the majority of the cases (85%). However, other proxies have been surfaced to capture the MES of the industry such as the median plant size (Daunfeldt & Elert, 2013) or the Sutton proxy (Sutton, 1991).

I inspect whether the argument about consolidation holds by calculating the MES based on the empirical distribution of practice size, using the Comanor-Wilson MES index (1967, 1969). More precisely, I take the median and then the average of the upper half of the practice size distribution. The resulting value corresponds to the MES index based on the utilized labour. Practices of size below the MES manage to exploit the returns to scale. More precisely, we look at the size of every practice in the industry that has or has not been recorded as part of a larger group of practices i.e. that is consolidated or unconsolidated.

3. Data

By combining publically available sources such as the NHS Digital and GP Patient Surveys and Reports, I compiled a unique dataset covering 8,262 general practices across England for a 4-year period, from 2013 through 2016, considering more than eighty per cent of all practices.

Data on mergers is not officially maintained by the NHS England, so I recorded the market status by matching the address and postal code of each practice through the NHS Choices site. Three types of practices were identified. The unconsolidated as those that never were part of a practice group (81.72%), the consolidated ones recorded as part of a practice group (17.25%) and the permanently closed practices (1.03%).

This is the first paper to study general practice consolidation in the NHS by employing hand-collected data. However the lack of official data does not allow for a perfect identification of the true agreement scenario between the practices (federation, merger, partnership etc.). The literature acknowledges the fact that it is not straightforward to derive a single measure of consolidation in the health care as there are many players (Gaynor and Haas-Wilson, 1999). Therefore, the term consolidation is adopted without any loss of generality.

To study the main research question, the number of full time equivalent doctors[2] in the practice, capturing the practice size is used. I also use data from the QOF files collected through the NHS Digital on the overall quality of services (Santos, Gravelle and Propper, 2017). The overall quality achievement score entails three sub-domains (clinical, public health and public health additional services) and practices collect points over a variety of indicators which are subject to annual changes. Therefore, the overall quality score captures the quality of services (in percentage points) without significant loss of information.

Moreover, I use official data on the total (and quality) payments (measured in £), from the NHS to individual practices, first recorded in the financial year 2013/14 to explore whether there are differences in the recourses of the integrated and non-integrated practices.

[2] This measure is results from the fraction of total hours worked by the general practitioner to the full time working week of 37.5 hours. This convention makes the aggregation of hours of full and part-time doctors by practice or area. A FTE value of 0.5, indicates a doctor who works half the time and so on (Kelly & Stoye, 2014).

4. Results and discussion

4.1 Consolidating; the economies of scale argument

Table 1 below presents how the consolidation activity has evolved within the period of study and the allocation of the practices by market status. The cells correspond to row percentages. Consolidation rises steadily up until 2015/16 only to experience a slight decline in the last period, as a consequence of the activity of the previous years, most likely. It is also possible that practices may have decided that being part of a practice group would not be the appropriate strategy for their business. Of all consolidated practices over the period, in 2013, 18.83% were recorded as part of a practice group while in 2016, the percentage was 27.71%. All in all, one in five practices has been recorded as consolidated over the period.

Table 1 Evolution of consolidation activity

	Year				
Market status	**Up to 2013**	**2014**	**2015**	**2016**	**Percentage**
Consolidated	18.83%	24.61%	28.85%	27.71%	17.25%
	1,039	1,358	1,592	1,529	5,518
Unconsolidated	27.06%	25.46%	24.12%	23.36%	81.72%
	7,074	6,656	6,306	6,108	26,144
Permanently closed	3.33%	12.42%	21.52%	62.73%	1.03%
	11	41	71	207	330

Note: Years correspond to financial years.
Source: Own construction.

Table 2 below presents the average practice size and minimum efficient scale (MES) by market status and for the primary care industry as a whole.

Findings indicate that (the average) practice size fluctuates over time. However, consolidated practices are on average larger than the unconsolidated ones, whereas those differences persist throughout the period. The MES for consolidated practices is larger (8.56 FTE GPs) compared to the unconsolidated ones (6.80), suggesting that economies of scale for consolidated practices exhaust in relatively larger size, with those exploiting the benefits of a larger scale. Therefore, we find evidence to support the statement that the argument about the exploitation of economies when consolidating holds for the particular sample and period.

From a conceptual standpoint, one might wonder whether there the fact that the two market status types should be treated as separate sub-markets within the primary care market. If

the two are not separate, then the MES of the industry should be the same for each one of those as well. However, results indicate that the MES for the industry and market types, deviate substantially. Therefore, we are inclined to treat each market separately. The latter indicates that the MES could be used as an indication for the existence of sub-markets or separate niches within a seemingly compact market.

However, differences between consolidated and unconsolidated practices could be explained by internal economies of scale. Economic Theory states that internal economies of scale are firm-specific, therefore in absolute control of it, stem from the size of the firm, irrespective of the industry those operate in, and depending on the context of firm's operations, take many forms.

As primary care is labour intensive industry (Given, 1996), those could be attributed to labour economies as consolidated practices are of a larger size implying that there is a broader skill-mix and therefore specialization, compared to unconsolidated ones. Moreover, there is also the possibility of managerial in conjunction to risk bearing economies, as GPs are self-employed entrepreneurs, acting as profit maximizers. The decisions taken by the management are towards the direction of increasing their list size and achieving higher quality scores so as to be better funded, and to the most possible extent reduce operating costs through a larger scale of operations. Moreover, they have undertaken the responsibility of managing all aspects of the practice from recruiting the appropriate professionals to handling potential risks e.g. financial.

Besides the internal, we should also consider the external economies of scale occurring at an industry level, conveying potential benefits for all firms. Those could take the form of contract changes that are negotiated nationally or other changes in regulation such as the abolishment of the body controlling and monitoring entry in 2006, resulted in free entry for new practices (Department of Health, 2006). High values of MES compared to the industry's average, could be considered as a strategic barrier to entry (Geroski, 1995). However, the relatively small difference between the MES at an industry level (6.57), compared to the average practice size (4.25), is most likely attributed to the fixed costs (e.g. premises, equipment, salaries) practices face upon start-up.

In the literature of healthcare organizations, external economies of scale are often characterized by economies of specialization. More precisely, Given (1996) finds increasing returns to specialization (external).

It is also noticeable that the returns to scale diminish relatively fast due to the fact that health care is labour intensive. However, such finding is not surprising as other studies report that economies of scale "*exhaust in relatively small sizes"* for physicians (Given, 1996; Pope & Burge, 1996, Wholey et al., 1996).

Table 2 Minimum Efficient Scale by market status

Year		Unconsolidated	Consolidated	All practices (industry level)	Difference (UC-C)
2013	MES	6.43	9.04	6.81	
	Average practice size	4.19	6.18	4.45	-1.99***
	St. dev. (Std. err. NI-I)	2.90	3.94	3.13	.103
2014	MES	6.44	9.25	7.18	
	Average practice size	4.25	6.30	4.60	-2.05***
	St. dev. (Std. err. NI-I)	2.86	4.06	3.19	.095
2015	MES	5.56	7.96	6.09	
	Average practice size	3.44	5.06	3.77	-1.61***
	St. dev. (Std. err. NI-I)	2.74	3.9	3.08	.087
2016	MES	5.72	8.18	6.26	
	Average practice size	3.81	5.58	4.16	-1.77***
	St. dev. (Std. err. NI-I)	2.52	3.64	2.87	.083
Whole sample	MES	6.80	8.56	6.57	
	Average practice size	3.94	5.72	4.25	-1.78***
	St. dev. (Std. err. NI-I)	2.79	3.91	3.09	.046

Note 1: Due to low representativeness (1.03%), permanently closed practices have not been considered.
Note 2: Stars indicate significance at 1% ***, 5% **, 10% *.

The calculation of the MES also serves in defining the increasing and decreasing returns to scale region. The former (IRS) is found on the left-hand side of the MES while the latter (DRS) is found on the right-hand side. Therefore, size deviations from the MES, call for different explanations.

As mentioned, economies of scale are indeed the main reason to be part of a practice group, and despite the fact that consolidated practices do benefit, those exhaust in relatively small sizes. Table 3 below presents the percentage of practices operating under IRS and DRS for each market type and for the industry as a whole. As shown in Table 3, the majority of practices, both by status and at an industry level, operate in the IRS region.

It is apparent that, there is a slight advantage for the consolidated practices which exploit the benefits of the merger by operating in the IRS region, especially in the short-run. In the long run, whole sample i.e. during the period of study, the percentage of consolidated in the IRS region remains higher than that of the unconsolidated practices.

All in all, the results of Table 3 complement the previous findings where consolidated practices manage to exploit economies of scale (and operate on IRS) to a greater extent compared to the unconsolidated ones. One in five consolidated practices operate under DRS, confirming that under DRS we find few and relatively large firms. Those practices could be super-practices, managed and run by large and diversified health care companies.

However, these results should only be considered as indicative of the on-going changes in a mature industry, and by any means it is not a stylized result of the primary care industry.

Table 3 Economies of Scale by market status

Year		Market status: Unconsolidated	Consolidated	All practices (industry level)
2013	IRS	77. 72% 5,466	80.75% 839	81.87% 24,388
	DRS	22.73% 1,608	19.25% 200	18.13% 5,401
2014	IRS	74.46% 4,956	78.72% 1,069	84.46% 25,161
	DRS	25.54% 1,700	21.28% 289	15.54% 4,628
2015	IRS	74.42% 4,693	77.95% 1,241	76.96% 22,926
	DRS	25.58% 1,613	22.05% 351	23.04% 6,863
2016	IRS	72.23% 4,412	74.62% 1,141	78.07% 23,255
	DRS	27.77% 1,696	25.38% 388	21.93% 6,534
Whole sample	IRS	57.52% 3,174	77.78% 4,292	80.21% 23,893
	DRS	42.48% 2,344	22.22% 1,226	19.79% 5,896

Note: The table is to be read vertically. Numbers correspond to the percentage of each practice type in each returns to scale region.

4.2 Consolidating; the higher quality perception

Besides the exploitation of returns to scale, another possible explanation for being part of a practice group is the perception of achieving higher quality (Given, 1996). Recent evidence by Kelly and Stoye (2014) states that larger practices (above 6 FTE GPs) achieve higher quality scores compared to smaller ones. Therefore, larger practices achieving higher quality could potentially receive more funding.

Since 2004, when the Quality of Outcomes Framework (QOF) was introduced, quality scores are linked to payments for performance. Practically, through this scheme practices are rewarded for providing high quality of services based on the points collected over a variety of indicators. Considering the above, consolidated practices are larger than the unconsolidated (Table 2 above) and should achieve higher quality scores and be better funded.

It is evident from Table 4 below that consolidated practices achieve higher quality scores and this is projected on the quality payments from the NHS. In addition, consolidated practices receive more funding in total as well. All differences are significant on an annual basis and for the

whole period as well. Moreover, we should notice that the average quality score for consolidated practices is greater than the industry's average score on an annual basis. Although not causal or stylized, evidence suggests that, on average, consolidated practices perform better than the average practice in the industry implying that consolidating contributes to some extent to better outcomes.

The fact that consolidated, and therefore larger, practices achieve better outcomes is perfectly compatible with the predictions of the Theory of Production because with specialized labour synergies are created and input complementarities occur. As mentioned above, labour and management economies are present leading to better results.

However a limitation of the study is that we cannot be definitive on whether higher quality practices are more likely to merge as official data on merging before and after the merger is not maintained by the NHS. Under the light of such data, a completely different analysis examining the effect of market status should be followed. We leave this for future research though.

Concluding, consolidated practices are larger and manage to achieve better quality scores, on average. Therefore, the perception that though consolidation practices achieve better outcomes proves to be confirmed by the particular dataset.

Table 4 Descriptives of quality scores and payments by market status

		Unconsolidated	Consolidated	All practices	Difference (UC-C)
2013	Overall QOF score	.935	.944	.937	-.009***
		(.078)	(.064)	(.076)	(.002)
	QOF payments	120,017	176,940	127,272	-56923***
		(80,591)	(113,248)	(87,587)	(3649)
	Total payments	921,534	1,449,340	988,866	-527806***
		(594,612)	(830,513)	(654,228)	(26773)
2014	Overall QOF score	.947	.958	.948	-.012***
		(.071)	(.058)	(.069)	(.002)
	QOF payments	85,772	131,801	93,437	-46029***
		(57,820)	(79,920)	(64,416)	(2299)
	Total payments	942,186	1,490,848	1,033,494	-548662***
		(589,045)	(866,749)	(676,038)	(24795)
2015	Overall QOF score	.955	.963	.956	-.009***
		(.067)	(.059)	(.066)	(.002)
	QOF payments	81,181	125,318	89,815	-44137***
		(54,120)	(78,659)	(62,380)	(2105)
	Total payments	957,569	1,516,661	1,067,101	-559092***
		(590,372)	(885,188)	(696,879)	(23608)
2016	Overall QOF score	.959	.968	.956	-.009***
		(.085)	(.077)	(.107)	(.002)
	QOF payments	81,725	128,007	88,986	-46283***
		(53,188)	(84,800)	(64,000)	(2288)
	Total payments	1,047,998	1,659,557	1,144,375	-611559***
		(650,438)	(983,936)	(776,530)	26674
Whole sample	Overall QOF score	.948	.960	.949	-.011***
		(.076)	(.066)	(.082)	(.001)
	QOF payments	92,990	137,473	100,070	-44483***
		(65,194)	(90,244)	(72,287)	(1289)
	Total payments	964,981	1,537,143	1,057,672	-572162***
		(607,538)	(902,661)	(704,085)	(12805)

Note 1: Mean values. Parentheses correspond to standard deviations and standard error of the *t*-tests.
Note 2: Stars indicate significance at 1% ***, 5% **, 10% *.
Note 3: Monetary values are in constant prices 2016/17 using UK Gross Domestic Product deflators.

5. Conclusions

It has been supported that general practices come together to form larger groups of practices in an attempt to benefit from a larger scale and ensure viability. I explore whether this argument holds considering more than eight thousand general practices across England from 2013 through 2016, using the Comanor-Wilson MES index.

The analysis is benefited by detailed matching to record the market status of all practices in the sample. I find that consolidated practices manage to benefit from a larger scale compared to the unconsolidated ones. However, the returns to scale exhaust relatively quickly. Moreover, the perception before practices join forces with a larger group of practice, about achieving higher quality of services, seems to be valid. Consolidated practices are larger, achieve higher quality scores and are better funded.

Although, its predictions are quite precise, a disadvantage of the Comanor-Wilson MES index is that it does not define a constant returns to scale region where the size of the practice would be equal to the MES, which might leave out of the analysis some of the practices.

A limitation of the study is that official data on mergers do not exist and the information about the timing of the merger and the exact practice characteristics before and after the merger or the true operating agreement between the practices (e.g. partnership, federation, acquisition etc.) after the merger, is not known.

However, this is the first attempt to record the market status of general practices in England for the specified period and the best approximation of the market we can have for the time being.

The study could be benefited by detailed records on the characteristics of the involved practices pre- and post-merger, detailed data on the composition of the practice, that is the number of FTE nurses, trainees and registrars and of course by a broader time window so as to capture any short as well as long run effects of integration on the practice operations.

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