



Health sector employment growth calls for improvements in labor productivity



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ABSTRACT

While rising costs of healthcare have put increased fiscal pressure on public finance, job growth in the health sector has had a stabilizing force on overall employment levels – not least in times of economic crises.

In 2014 EU-15 countries employed 21 million people in the health and social care sector. Between 2000 and 2014 the share of employed persons in this sector rose from 9.5% to 12.5% of the total labor force in EU-15 countries. Over time labor input growth has shifted towards residential care activities and social work while labor in human health activities including hospitals and ambulatory care still comprises the major share. About half of the human health labor force works in hospital. Variation of health and social care employment is large even in countries with generally comparable institutional structures. While standard measures of productivity in health and social care are not yet comparable across countries, we argue that labor productivity of a growing health work force needs more attention. The long-term stability of the health system will require care delivery models that better utilize a growing health work force in concert with smart investments in digital infrastructure to support this transition. In light of this, more research is needed to explain variations in health and social care labor endowments, to identify effective policy measures of labor productivity enhancement including enhanced efforts to develop comparable productivity indicators in these areas.

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1. Introduction

Health policy is increasingly a concern of economic policy. The labor force is the most important resource in any health care system. In recent decades job growth in

the health and social care sector has over-compensated for job reductions in industry and manufacturing in many EU countries [1]. Yet employment growth in health and social care sectors is likely to accelerate further. We infer from these trends that the importance of labor productivity enhancing policy measures should be addressed and differences across countries should be better understood through focused research. First, on-going technological progress including digitalization will attract high-skilled labor into this sector. Second, emerging chronic care needs require more and diverse labor inputs to meet a broad range of care demands. Social and health care sectors may provide employment opportunities in times where unemployment

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levels resulting from recessions remain high and where, in advanced economies, an overall shift in the labor force from manufacturing to service sectors is taking place. Even though there is some evidence that the health sector suffers from “Baumol cost disease” [2–4] recent analysis shows that this effect on health expenditure growth is rather moderate if existing at all [5,6]. Rather, health care expenditure was found to be largely quantity driven, suggesting that Baumol’s cost disease effect diminishes with adequate specifications of variables commonly used to show the Baumol effect [5]. In turn this implies that policy measures are likely effective when they target the rapid expansion of technology, e.g. digitalization of care processes, assessing additional benefits of health technology and importantly by enhancing health labor productivity. We define labor productivity as output per hour. By convention the volume measure of output is measured either by gross domestic product or by gross value added; labor input is measured either by the total number of hours worked of all persons employed or total employment, often head counts. In health care labor productivity is calculated as the growth in medical services over growth in labor input [7]. As in all industries labor inputs and capital inputs are needed in health and social care to produce outputs and ultimately outcomes. For example, the labor share in the health and social care value added was 90% in 2010 in Austria while the corresponding share in manufacturing was 64%. Over time the labor share in health and social care value added decreased from 96% in 2000 to 90% in 2010 while the labor share in total value added in manufacturing increased slightly in the same period from 62% to 64%. As a consequence, the capital share in total value added in manufacturing declined while the capital share in total health and social care value added increased six percentage points from 4% to 10% in 2010 [9]. This reflects relative strong technical progress in this sector. At the same time currently available measures of labor productivity at industry level (EU-KLEMS) do not yet permit meaningful comparison of the performance of health and social care across industries and across countries [8]. But these data may well be useful looking at the use of ICT. For example, between 2000 and 2010 the penetration of ICT services in the German health care sector appears much higher compared to other countries. Equally, the contribution of ICT services to value added growth was visibly higher compared to the contribution to value added growth of non-ICT capital, e.g. buildings, beds, equipment to value added growth. But variations in the ICT component of capital services across countries is pronounced and overall the labor share in total value added remains high everywhere compared to other industries. The focus of the paper is on the supply of health and social care that is the “engine room” of health economics [10]. This includes hospital production, input substitutions, labor markets, delivery models and the responses of institutions and the health care workers to changes in their environments and modes of payment. The health care “industry” with the medical supplies sector (pharmaceuticals, equipment, etc.) plays a crucial role as part of the supply side. But for the purpose of this paper, we discuss key issues of health and social care supply which includes long-term care and care for other groups

like the mentally ill and the disabled. The objective of this paper is to outline the nexus of the impact of health sector employment growth on (economic) performance. We argue that (labor) productivity in health and social care needs enhancement through improved delivery models and that accelerated penetration of ICT in this sector should support this transition. With this paper we aim to bring to the attention several important issues related to employment growth in health and social care sectors, both for the health sector itself and for the economy as a whole. It is suggested that structural reforms in care delivery should address labor productivity enhancing policy measures to improve health system and economic performance.

2. Methods

First, we look at employment trends in Austria, Belgium, Denmark, Germany, France, The Netherlands, Sweden and Switzerland between 2000 and 2014 using Eurostat data [1] Eurostat data report head counts of employment per economic activity. The Labor Force Survey of the European Union uses the Eurostat Statistical classification of economic activities in the European Community (NACE) to code the economic activity. Over time, the LFS used NACE 1970 until 1992, NACE Rev. 1 from 1993 to 2004, NACE Rev. 1.1 from 2005 to 2007, NACE Rev. 2 from 2008. While in NACE rev 1.1 Section N reports employment in “Health and social work”, the corresponding section NACE rev 2 is Q reporting employment in “Human Health and social work activities”. The revision excludes veterinary services and as previously also excluded, public administration including employees of compulsory social security [11]. We utilize both sources to show trends over time while the differentiation of the workforce in health and social care sectors is only possible since 2008. Even though labor market statistics are subject to quite comprehensive international definitions, principles and guidelines, which make it one of the most harmonized statistical domains not only in Europe but worldwide, there is still room for further improvement of cross-country comparability. A Task Force coordinated by Eurostat is currently working to identify shortcomings and propose possible improvements for the cross-country comparability of the national Labor Force Surveys in the EU [12]. While the data available serves our purpose in showing the development of employment over time, sectors and countries, improvements in the data are necessary to allow for an in-depth comparative analysis of the health care sector only. The selection of countries was made to ensure a mix of high-income European countries with high levels of social and health protection. We do not classify health care models as traditional boundaries between tax-financed versus social health insurance approaches have become increasingly blurred [13]. Descriptive statistics is employed to compare growth patterns of health social care employment for our set of countries between 2000 and 2014 to those in the service sector and those in all sectors of economic activities. Also output, input and productivity measures at the industry level (EU KLEMS data) [9] were analyzed and the performance of the health care sector was compared with other economic activities. Second, we present a conceptual model to sketch the impact of

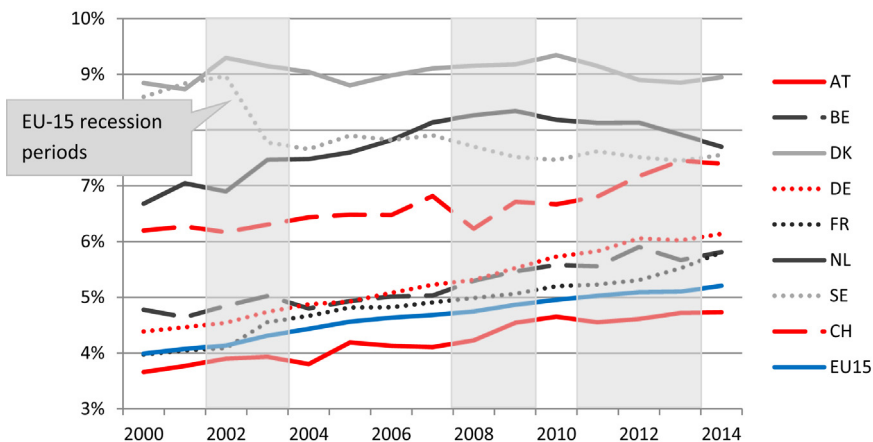


Fig. 1. Employment in health and social care per capita (2000–2014). Recession as defined in Table 1.

Sources: EUROSTAT, NACE rev. 1.1 and 2, own calculations 2015, EUROSTAT data report head counts of employment per economic activity (NACE). The classification of rev 1.1 of the NACE was revised to become NACE rev 2 as EU-standard from 2008 on. While in NACE rev 1.1 Section N reports employment in “Health and social work”, the corresponding section NACE rev 2 is Q reporting employment in “Human Health and social work activities”. The revision excludes veterinary services and as previously also excluded, public administration including employees of compulsory social security. Data on real GDP growth for 2014 not available as of August 2015.

employment growth in health and social care on overall productivity. Finally, we conducted a literature review to identify key policy areas with high potential to enhance the productivity of a growing health work force.

3. Results

In 2014 EU-15 countries employed 21 million people in the social and health care sector [1]. Between 2000 and 2014 employment in this sector rose by 5.9 million corresponding to an increase of 39%, almost double the rate of growth observed in the service sector (22%). In contrast and in the same period employment in industry went down as a whole almost everywhere generating job losses on the order of 6.9 million. Consequently, the share of employed persons in the health and social care sector in total employment rose across Europe (EU-15) from 9.5% to 12.1% between 2000 and 2014, on a per-100-capita basis the increase was from 4 health and social care workers to over 5 in 2014 (Fig. 1).

Labor endowment of the health and social care sector measured in head counts shows a wide dispersion across countries, ranging from 5 health professionals per 100 capita in Austria to almost 9 per 100 capita in Denmark in 2014 (Fig. 1). When looking at the composition of the health and social work force, human health activities, i.e. activities related to hospitals as well as medical and dental practices, still comprised by far the largest share of the health and social care labor force in EU-15 countries in 2014 (65%) (Fig. 2).

About one half of the workforce classified in human health activities works in hospitals. Variations across our set of countries (there is no data for Sweden) are substantial as are variations over time. For instance, about 75% of the human health labor force in France works in hospitals while in Austria the share is 42%, followed by equally low shares in Germany (45%) and in the Netherlands (49%) when compared to France.

Overall, between 2008 and 2014 labor input growth has shifted towards residential care activities and social

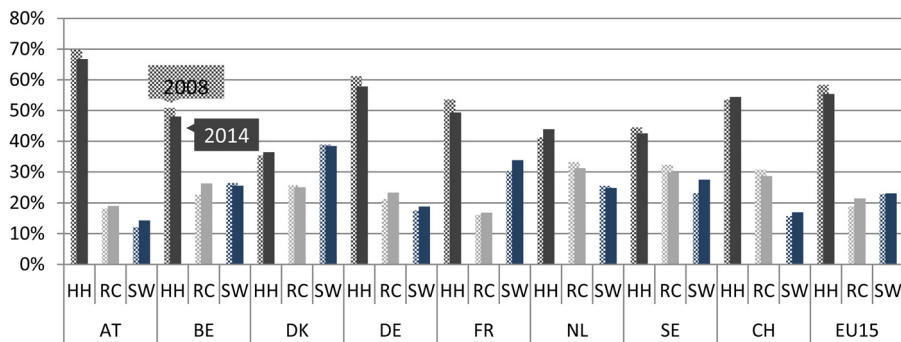


Fig. 2. Categories of employment in health and social work, % of total (2008–2014). HH: human health activities, RC: residential care activities, SW: Social work activities without accommodation; AT: Austria, BE: Belgium, DK: Denmark, DE: Germany, FR: France, NL: The Netherlands, SE: Sweden, CH: Switzerland.

Sources: EUROSTAT, NACE and 2, own calculations 2015, EUROSTAT data report head counts of employment per economic activity (NACE). NACE rev 2 Q reports employment in “Human Health and social work activities”. The revision excludes veterinary services and as previously also excluded, public administration including employees of compulsory social security.

Table 1
Growth in health and social care employment,^a 2000–2014.

		Growth rates and dispersion					Real GDP <2% ^c	
		Average	Min	Max	Variance	SD		#Outliers ^b
AT	Services	1.3	−0.3	3.9	1.5	1.2	1	2001–2003, 2008–2010, 2012–2013
	Health/social work	2.2	−2.8	11.0	11.9	3.5		
	All sectors	0.8	−3.7	3.9	2.8	1.7		
BE	Services	1.4	−0.8	4.0	1.7	1.3		2001–2003, 2005, 2008–2009, 2011–2013
	Health/social work	2.6	−4.0	8.4	12.5	3.5		
	All sectors	0.9	−2.0	3.3	1.8	1.3		
DK	Services	0.8	−1.3	4.0	2.3	1.5	1	2001–2003, 2007–2013
	Health/social work	0.4	−2.4	6.7	5.3	2.3		
	All sectors	0.0	−2.9	1.9	1.8	1.3		
DE	Services	1.4	−1.0	4.7	1.7	1.3		2001–2005, 2008–2009, 2012–2013
	Health/social work	2.3	−0.3	4.3	1.3	1.1		
	All sectors	0.7	−1.3	2.5	1.2	1.1		
FR	Services	1.7	−0.4	3.8	1.7	1.3	1	2001–2003, 2005, 2008–2010, 2012–2013
	Health/social work	3.3	0.8	12.1	7.1	2.7		
	All sectors	1.1	−1.0	3.0	1.4	1.2		
NL	Services	1.0	−4.1	7.2	8.7	3.0		2001–2003, 2008–2013
	Health/social work	1.8	−2.3	8.8	10.2	3.2		
	All sectors	0.5	−2.6	3.4	2.5	1.6		
SE	Services	1.7	−0.5	6.3	2.4	1.6	1	2001, 2008–2009, 2012–2013
	Health/social work	−0.4	−12.9	3.6	14.9	3.9		
	All sectors	1.1	−2.0	5.2	2.5	1.6		
CH	Services	1.7	−4.6	6.6	5.6	2.4	1	2001–2003, 2009, 2011–2013
	Health/social work	2.4	−7.4	9.1	13.8	3.7		
	All sectors	1.1	−0.1	2.6	0.6	0.8		
EU-15	Services	1.5	−0.2	2.8	0.9	1.0		2002–2003, 2008–2009, 2011–2013
	Health/social work	2.3	0.6	4.8	1.0	1.0		
	All sectors	0.7	−1.8	2.0	1.2	1.1		

Source: EUROSTAT, own calculations 2015, EUROSTAT data report head counts of employment per economic activity (NACE). The classification of rev 1.1 of the NACE was revised to become NACE rev 2 as EU-standard from 2008 on. While in NACE rev 1.1 Section N reports employment in “Health and social work”, the corresponding section NACE rev 2 is Q reporting employment in “Human Health and social work activities”. The revision excludes veterinary services and as previously also excluded, public administration including employees of compulsory social security. Data on real GDP growth for 2014 not available as of August 2015.

AT: Austria, BE: Belgium, DK: Denmark, DE: Germany, FR: France, NL: The Netherlands, SE: Sweden, CH: Switzerland.

^a Defined as persons aged 15 and over who performed work, even for just one hour per week, for pay, profit or family gain during the reference week.

^b Using the Grubb's test.

^c We define economic slowdowns or recessions as occurring when in any single year per capita GDP falls below a real annual growth rate of 2%, which corresponds to recent long-term forecasts (Duval and de la Maisonnette [40]); no seasonal adjustment.

work as indicated in Fig. 2. In most countries the employment share of residential care activities and social care has increased but again quite varied across countries. Yet with ongoing specialization in medicine in parallel to emerging chronic care needs, these occupations become increasingly important in delivering comprehensive quality care that is coordinated between health, long-term and social care [14–16]. On average across EU 15 countries health employees in human health activities form the largest group followed by workers in social and residential care activities. While variation in the latter two groups is likely higher than in the human health labor force, the share of labor in human health activities in the total health labor force is big making growth rates less sensitive to variations. Thus we use the total number of health and social work employees in looking at growth patterns as displayed in Table 1.

Between 2000 and 2014, job growth in health care and social work has not only outpaced employment growth in the economy as a whole but also in individual service sector

divisions. Table 1 presents growth rates of employment in the health and social work sector, the service sector and the economy as a whole for our selection of EU countries and Switzerland. Yet, the pattern is not always consistent: With the exception of Denmark and Sweden the average growth of health sector employment is outpacing growth in the service sector and in the overall economy. However, in general the growth pattern in particular in the area of social work and residential care is volatile when compared to the service sector and to the economy as a whole. While this is sometimes due to outliers, the variation of health employment growth remains strong even when excluding outliers.

For most countries considered the trend of constant employment growth in the health and social work sector holds true even when years of crisis are considered: While in 2009 employment continued to decline globally, particularly in manufacturing, transportation as well as in wholesale and retail trade [17], employment continued to grow

steadily in the health sector [18–20]. In every country but Sweden and Denmark – the two countries with the highest health and social sector employment per capita – the health and social work sector has added jobs since 2000, even in years of sluggish growth: On average EU-15 countries added 3.4% jobs per year during the first slowdown from 2002 to 2003, 2.4% during the second (2008–2010) and 1.4% since 2012. Thus, our data confirm the permanence of health sector employment growth even when the economy loses steam [21], a trend that has also been shown in studies on individual countries, e.g. Germany [22].

4. Discussion

Trends in aggregate labor input conceal considerable diversity by type of labor employed (Fig. 2). Because of accelerated population ageing in the future, chronic care health needs likely increase. In concert with maturing long-term care schemes in many countries up-skilling in residential and social care activities is expected along with strong growth of these occupations. At the same time many countries are already facing a shortage of health professionals, and without an adequate number of staff, a country's ability to improve its performance will be impaired [23–25]. Equally important is that the labor force possesses the necessary skills, particularly in the face of increasing chronic care needs [21,24,26] and specialist skills needed as a consequence of rapid technology adoption [27].

4.1. Health employment and technical progress

The health and care sectors create demand for a number of industries, e.g. pharmaceuticals, ICT, diagnostic and imaging equipment, biotechnology, etc. These industries are associated with frontline knowledge, research and innovation and the development of high-tech products [22]. Medical technology for improving health and quality of life in particular for the elderly increasingly replaces costly clinical interventions with genetically engineered drugs and treatments, targeting the molecular basis of disease. Modern stroke therapy offers a good example here [28]. Investment in biomedical technology in and of itself is an important engine of growth [21], possibly compensating for increased resources needed in the social and health care sector. Moreover, the final output of the health care sector – ensuring a healthy population – will impact the productive capacity of the workforce in general and thus has consequences across all sectors of the economy [7,29,30]. Finally, improvements in health states and in quality of life often remain hidden in performance assessments of health systems. Indeed, scholars have shown that while new technology generally increases expenditure, the benefits of improved interventions may outweigh the extra costs [31,32]. For example, for several chronic diseases the net value of treatment has grown, consistent with medical technology improving over time and leading to better health outcomes at lower cost. For some important chronic care conditions, the increase in health outcomes was accompanied by a decrease in per-patient spending [33].

Adoption and widespread use of technology which is often complementary rather than substitutive is generally accepted as the main driver behind increasing health expenditure [56–58] and is an important determinant of the performance of the health sector [34–39]. In particular, a growing number of chronically ill people will use an increasing number of “half-way technologies”. For example, halfway technologies are more and more used to stabilize health states or improve quality of life for patients with a given disease which cannot be entirely cured, e.g. cancer, HIV-AIDS. Thus, half-way technologies are often more cost enhancing than cost containing [37].

4.2. Health employment and productivity

The health and social work sector has a large impact on the performance of economies as a whole [23]. Even if diseases cannot be cured to fully restore the health of individuals, quality of life improvements through effective treatment and care is welfare enhancing [41]. Fig. 3 illustrates the impact of health sector employment growth on the economy in a stylized way. First, in European countries health and many social services are predominantly financed and delivered in the public sector [9]. Rising employment in health and social care contribute strongly to the pressure on public spending through an increasing wage bill.

Even though wage increases only account for a small fraction of health expenditure growth [5], labor costs constitute the greatest proportion of current health spending. Estimates suggest that in many countries this is between 60 and 80% [42], for the US it has been estimated to be 56% [43]. Health sector wages are largely administratively fixed and in many countries relatively equal across geographical areas (e.g. in the UK) [44,45]. Thus, health sector wages and incomes are unlikely to vary substantially throughout business cycles. Further, increasing unification of the health labor force may also contribute to that and help attract skilled labor in this sector [46]. This in turn adds to the stabilization of public revenues if gainful employment consistently grows and over-compensates job losses in other economic activities. The OECD Ministerial Committee 2010 recognized that the health sector is an important social and economic stabilizer during times of crisis [47] even though health spending pressures contribute significantly to government debt in many OECD countries [20] and country-specific institutional factors likely contribute to long-term spending trends [55]. At the same time permanent employment growth in health and social care has a stabilizing effect on overall employment levels which also implies that public revenues through taxes and contributions are stabilized or even growing.

Second, it is well established that there are unresolved measurement issues in non-market areas where health and social services largely belong. The main problems in measuring labor productivity in non-market sectors relate to the lack of market prices that allow aggregation across diverse outputs [8] in addition to the need to incorporate quality improvements. Typically, in the past, nominal output was measured by wages, sometimes including an imputation for capital costs. If output is measured by

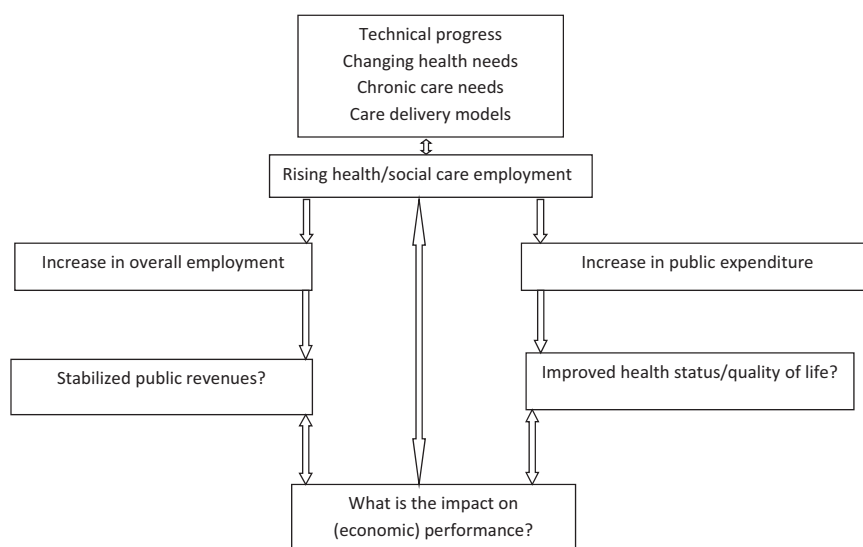


Fig. 3. A stylized model of the impact of health sector employment growth on the economy.

Source: Authors.

inputs, productivity growth should be zero by definition. Moreover, the contribution of the health and social care sector employment to overall productivity is patchy and often even negative [43].

More recently, there has been a move to employ quantity indicators to measure volumes of output, with EU countries facing a Eurostat target of removing dependence on input measures [48]. On balance, health volume output should be measured as the quantity of health services provided to individuals with an adjustment for new products or services and quality change and not as the quantity of inputs used to produce these services [48]. While there are many important initiatives to capture the impact of technology on improved health and higher quality of life [49–52], no international standards have been established to improve productivity estimates in this area [7].

In researching EU KLEMS data we found no evidence of enhanced skill levels over time and across countries which would allow observing differences in labor productivity. Reasons for that may be that Labour Force Survey data are not detailed enough to identify such changes. Also, the training of health workers, in particular of non-medical labor has often been altered in recent years in many countries reflecting adaption to technical progress and changed care needs. Both up-skilling took place and changes in concepts to stratify labor in consistent educational classes which are comparable over time have changed. On the other hand, we found that ICT service contribution to capital compensation differs across countries in the area of health [9]. But more marked are growth differentials between ICT services and non-ICT services and their respective contribution to value added. Moreover, across countries we see a pronounced performance differential within ICT services in their country specific contribution to value added growth. For example, when looking at a 10-year period from 2000 to 2009 the mean ICT contribution to value added growth in Germany (2.01 percentage points) and in the Netherlands (2.31 percentage points)

was more than double of that in Austria (0.85 percentage points). This may point towards varying levels of investments in ICT infrastructure including digitalization of care processes. Recent analysis in Germany showed that the health care industries (pharmaceuticals, medical devices and trade) are the main driver of productivity. At the same time the service-oriented part of the health economy is the main contributor to the health sector's stabilizing force on the industry's gross value added and employment [22].

Currently available data for comparative research do not yet deliver complex measures of labor productivity to account for improved outcomes or quality changes. For instance, productivity measured as discharges per full-time equivalent hospital employee has been going down in recent years in a number of countries [1] even though the quality of care in various important areas has evidently improved [33]. Moreover, there are visible variations in the level of the indicator discharges per full-time equivalent hospital employee even across countries with a largely comparable institutional make-up. For example, while in 2013 discharges per full-time equivalent hospital employee in Germany (21.2) was highest across countries and also stable over time this rate is clearly lower in Austria (16.6) and in Belgium (12.7), where rates decreased between 2008 and 2013. The rate in France (11.2), the Netherlands (9.4), in Switzerland (9.3) and in Denmark (8.0) was well below the weighted average (15.5) of this set of countries [1].

Focused comparative research is needed to analyze these differences. If the health care sector is to achieve even the average gain of labor productivity that other sectors in developed economies have experienced, care delivery models need to be redesigned fundamentally using a different quantity and mix of workers engaging in a much higher value set of activities [21,43,61]. The introduction of new technology requires health workers to be properly trained, and if necessary taught new skills [27]. Moreover, it is necessary to gain the acceptance of

the health workforce for its use, which may sometimes disturb established working methods and structures, e.g. digitalization. In particular, attention needs to be given to investment in change management, an often-neglected area for leveraging productivity gains in care delivery [62].

4.3. Health employment, productivity and delivery models

Our data showed that health and social care employment growth is strong in many countries even in times when economic performance is weak. Even though there is some indication of cross-country differences in productivity on the level of capital compensation and evidence that health industries are driving productivity [22], the contribution of labor to value added of the health and social care sector is much more important, around 90% of total value added [9]. Thus more attention needs to be given to the productive potential of the health care work force providing care and services to patients.

Recent empirical evidence indicates that policy measures may well be effective in lifting labor productivity [5,6]. Care delivery models need to be re-engineered to permit enhanced labor productivity that is directed towards increasing the value of care [53,54]. Improving health system performance depends on a fundamental shift in healthcare delivery towards better aligned care that promotes collaboration and coordination across specialties [60,63] with an increased emphasis on multidisciplinary care teams [64,65]. Recent reform initiatives hint to the potential of a set of measures, which appear promising in this respect. For example, Denmark has shown national leadership in developing an integrated care strategy [66–68], Germany has been successful in tying financial incentives to integrated care reforms [69–72] and the Netherlands has introduced payment reforms to address fragmentation in care delivery and promote multidisciplinary care teams [71,73,74]. While there are still challenges with bundled payments because of complexities but also rationing incentives [71,74] moving away from fee-for-service payment to the payment of episodes of care might reduce wasteful care and save cost [75,76,59].

Multi-professional team-based care is gaining momentum as a strategy to improve outcomes, continuity [77–79] and likely also the effectiveness of health care from primary care to acute, hospital-based tertiary settings [14,15,80]. To achieve a successful and sustainable health system it is crucial to implement a variety of measures simultaneously [81,82]: re-engineering care delivery and re-forming payment to promote multi-disciplinary team models must complement prevention, health IT and evidence-based decision making, which are all essential to enhancing higher-value health care and the long-term stability of the health system.

Further research is needed to evaluate delivery models in particular their capacity to improve labor productivity while addressing fractured service delivery, payment modes and working cultures which are often found to inhibit much needed performance improvements.

5. Conclusion

Trends in productivity and efficiency in health and social care sectors have a large and increasing impact on economy-wide performance, such as the level of public spending, the allocation of public revenues to various areas of public spending and competitiveness through its impact on labor costs.

Even though not always consistent, we found strong employment growth in the area of health and social care, including during times of economic slowdowns. We argued that there is much potential for policy makers to contain public health spending growth by enhancing labor productivity of a growing health and social care labor force. This should be aligned with strategic and supportive investment in digitalization and change management. Although important initiatives are underway to improve productivity measurement in the area of health, international standards to measure labor productivity are required.

At the same time early experiences from new delivery models that are currently being implemented or piloted point to the potential of enhanced labor productivity. Greater leadership and good governance on the central government level seems important to initiate consistent and strategic change of care delivery. Also, financial incentives to promote multidisciplinary delivery models, which re-define the roles of health professionals to enhance overall productivity of the health care team appear instrumental. Finally, episode-based payment bridging health and long-term care sectors and rewarding teamwork could have a positive impact on productivity, especially given an ageing population with an increasing burden of chronic disease.

While this paper has sought to highlight the growing economic importance of the health and social care sector it is only a starting point for further analysis of the nexus of a vigorous health labor market and needed structural changes in care delivery including investments in digital infrastructures. Fueled by technical progress often in response to changing health needs delivery models need transformation to raise the productive potential of a growing health workforce especially in light of challenges and missing standards to measure productivity in this area.

First, more analysis is needed to explain differences in the health labor endowment across EU countries which are likely caused by the impact of the underlying welfare model, e.g. the issue of primacy of family versus government responsibility. Second, little is known about the optimal input mix, in particular about the optimal labor input mix in health systems, a fact that complicates productivity analysis beyond conventional measurement issues. Third, the measurement of productivity in the health sector should take into account the full skill range of the “high tech” labor force which is currently classified in other economic activities, e.g. IT industry, imaging and also bio-engineering and scientific research and development in this area. Finally, more rigorous evidence of performance improvements through the key delivery model reforms is needed to make them true conditions for productivity enhancement of the health labor force.

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