PharmacoEconomics (2023) 41:1093–1101
https://doi.org/10.1007/s40273-023-01261-y

ORIGINAL RESEARCH ARTICLE

Estimating Global Friction Periods for Economic Evaluation: A Case Study of Selected OECD Member Countries

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Accepted: 5 March 2023 / Published online: 10 April 2023
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Abstract

Background The friction cost approach (FCA) offers an alternative to the dominant human capital approach to value productivity losses. Application of the FCA in practice is limited largely due to data availability. Recent attempts have tried to standardise the estimation of friction periods across Europe, but to date, this has not been attempted elsewhere. Our aim was to estimate friction periods for 17 Organisation for Economic Co-operation and Development (OECD) member countries between 2010 and 2021 based on routinely published data.

Methods We derived friction period estimates for Australia, Austria, Canada, Czechia, Finland, Germany, Hungary, Japan, Korea, Luxembourg, Norway, Poland, Portugal, Sweden, Switzerland, the United Kingdom and the United States. Vacancy stock and flow data was sourced from the OECD's short-term labour situation database from 2010 to 2021, and included the impact of Covid-19 on the labour market. The estimated friction periods were applied to cost cancer-related premature mortality for the United States as an illustrative case.

Results The average friction period in the five non-European countries (Australia, Canada, Korea, Japan and the United States) was 61.0 days (SD 9.4) (range between 44.8 days in Korea and 82.2 days in Canada) and the average friction period in the 12 European countries was 60.6 days (SD 14.8) (range between 34.1 days in Switzerland and 137.3 days in Czechia). In both cases, the outbreak of Covid-19 increased the length of the friction period. Our illustrative case revealed that productivity costs in the US were over a third lower using the study-specific friction period (56 days) compared with the conventionally assumed 90-day friction period applied in the literature as a default measure.

Conclusions Our results expand the potential application of the FCA outside of Europe and will support greater utilisation of the FCA and wider inclusion of productivity costs in societal-based economic evaluations based on the use of widely available and updated key labour market variables in our selected countries.

1 Introduction

Economic evaluations attempt to capture the costs and benefits associated with health interventions in as robust and comprehensive a manner as possible. Consensus largely exists in the selection and costing of direct components of intervention costs (e.g. medical costs), however, much debate remains over the inclusion, and measurement, of more intangible indirect costs [1–4]. To date, the two most prevalent methods used in health economics to measure illness-related productivity costs are the human capital approach (HCA) and the friction cost approach (FCA).

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It has been suggested that the FCA, which measures lost productivity arising from illness and associated worker absence until the restoration of output levels in the firm to previous levels by a replacement worker, produces a more accurate measure of the actual productivity loss of an illness compared with the more widely used HCA [5]. Recent attempts have sought to standardise the estimation of friction periods across Europe using routinely published data [6], but to date, this has not been attempted for counties elsewhere.

National Statistics Agencies tend to collate data independently and the nomenclature and data collection procedures around the area of labour statistics and vacancies can differ markedly, hindering standardisation of measurement. In addition, the length of time to restore a firm's production level (friction period) can vary based on the

Key Points for Decision Makers

Lack of country-specific friction periods limits widespread use of the friction cost approach.

Our paper uses routinely collected data from the Organisation for Economic Co-operation and Development (OECD) member countries to expand the range of countries for which the friction cost approach can be applied outside of Europe.

Our estimates are reproducible and can be updated over time and encompass the impact of Covid-19 on the estimation of friction periods.

extant macroeconomic conditions in an economy [7]. Factors such as the level of unemployment, the stock of vacancies and the type of work undertaken influence this [6, 8] and events such as the outbreak of a global pandemic can result in further impact. Therefore, accurate friction period estimates require continual updating and access to a wide range of standardised labour and macroeconomic data on a country-specific basis. To date, this has proved an obstacle to estimating friction periods outside of Europe [4, 9].

Our aim was therefore to estimate friction periods for 17 Organisation for Economic Co-operation and Development (OECD) member countries between 2010 and 2021 based on routinely published data. Friction periods are applied to cancer-related premature mortality data in the United States (US) as an illustrative example, and the results compared with standard friction period estimates used in the literature. This study complements and expands upon previous work [6] to increase the potential range of FCA application beyond its traditional Eurocentric focus.

Our sample time frame encompasses the recent Covid-19 pandemic and therefore provides insight into how this global event impacted key macroeconomic and labour market variables that contribute to the generation of friction period estimates.

2 Methodology

We derived friction period estimates for 17 OECD countries—namely, Australia, Austria, Canada, Czechia, Finland, Germany, Hungary, Japan, Korea, Luxembourg, Norway, Poland, Portugal, Sweden, Switzerland, the United Kingdom (UK) and the United States (US) between 2010 and 2021 for which comprehensive data is available from the OECD database. Of these, 12 (Austria, Czechia, Finland, Germany, Hungary, Luxembourg, Norway, Poland, Portugal, Sweden, Switzerland and UK) were included in our previous work [6], but here a different time period and data source has been considered which ensures comparability with country friction period estimates outside of Europe.

2.1 Data Sources and Definitions

The friction period is the period of time necessary to restore a firm's production level following the loss of a worker through illness-related morbidity or mortality. The core component of the friction period is the length of the vacancy period that follows the opening up of a new job in a firm. This metric relates the stock of unfilled vacancies in the economy to the flow of filled vacancies and can be influenced by labour market endogenous variables such as the unemployment rate.

We sourced the majority of the vacancy stock and vacancy flow data for this study from the OECD's routinely collected unemployment and job vacancy data which is presented as a subset of the short-term labour situation database (https://stats.oecd.org/). The OECD's job vacancies data provides estimates of the number of unfilled job vacancies across national economies which we used as our measure of the stock of vacancies in an economy and which provides an indication of labour demand.

A job is considered vacant according to the OECD if it meets the following conditions:

"*it is vacant on the reference date (first day of the month) or will become vacant during the month; there are tasks to be carried out during the month for the job in question; and the employer is actively seeking a worker outside the organization to fill the job. The jobs could be full-time, part-time, permanent, temporary, casual, or seasonal.*" (https://stats.oecd.org/)

2.2 Vacancy Stock Data and Filled Vacancy Data

Different sources were used to extract data. On the one hand, for 12 countries (Austria, Czechia, Finland, Germany, Hungary, Luxembourg, Norway, Poland, Portugal, Sweden, Switzerland and UK), job vacancy data was compiled by the OECD from administrative sources derived from vacancies notified by firms to employment agencies and local labour offices which remain unfilled at the end of each month. On the other hand, Australian vacancy data compiled by the OECD was based upon a population-based monthly survey of 4600 employers updated each quarter and published in the ABS Business Register (https://stats.oecd.org/).

Supplementary vacancy stock data sources were used for Canada, Korea, Japan and the US due to their absence within the OECD database (Canada, Korea, Japan), or their incompatibility with other data sources (US). (In these additional sources, data for every year of the sample period is sometimes unavailable as indicated in the results.) In the US, the alternative source used was the JOLTS survey—a stratified random sample of 20,700 nonfarm business and government establishments drawn from a universe of over 9.4 million establishments compiled by the Quarterly Census of Employment and Wages (QCEW) program (https://www.bls.gov/jlt/). Canadian data was sourced from Statistics Canada—Job Vacancy and Wage Survey (JVWS), a stratified random sample of approximately 100,000 business locations drawn quarterly from the Business Register (BR) (https://www.statcan.gc.ca/en/survey/business/5217). Korean data was sourced from the Ministry of Employment and Labour (MOEL) data and based on the Occupational Labour Force Survey Establishments which covers a sample of 32,300 workplaces with five or more permanents employees (https://www.moel.go.kr/english/resources/survey.do) and Japanese data was sourced from the Employment Referrals for General Workers Survey (https://www.mhlw.go.jp/english/database/db-l/general_workers.html).

A measure of annual flows of filled vacancies per country was sourced from the OECD data on job tenure of workers (https://stats.oecd.org/Index.aspx?DataSetCode=TENURE_AVE), which is the length of time spent working with the same employer or, if self-employed, on the same job and is derived from various European Labour Force Surveys. As the OECD explains, this information is valuable for estimating the degree of fluidity in the labour market and in identifying the areas of economic activity where the turnover of labour is rapid or otherwise. For the purposes of this study, we extracted data on job tenure of <1 year and, following previous work [6], used this to approximate annual flows of filled vacancies per country.

2.3 Friction Period Formula

We calculated the average vacancy duration following the loss of an employee in each country based on the stock of unfilled vacancies and the annual flows of filled vacancies as defined above. Specifically, following Hanly et al. [6], we calculated the aggregated vacancy duration for a given year and a given country as follows:

$$\text{Annual vacancy duration (VD)} = 365 \times \left[\frac{\sum_{i=1}^{4} \frac{Vi}{4}}{\sum_{i=1}^{4} Mi} \right],$$

where V is the stock of unfilled vacancies and M is the flows of filled vacancies.

An additional 4 weeks was added to estimated country-specific vacancy duration estimates to account for the time required to advertise a job and to provide initial training, resulting in the total friction period (i.e. vacancy duration plus advertising and training period) [10]. Results are provided per year and are shown by country, and for European and non-European countries combined.

2.4 Illustrative Case: Cancer-Related Premature Mortality Friction Cost Approach (FCA) Valuation in the United States

The estimated friction periods were applied to cancer premature mortality data for the United States as an illustrative case to compare the 'standard' (i.e. used in past studies, but largely based on labour force data derived from the Netherlands) friction period of 90 days applied in the literature to the 2020 country-specific estimate calculated here. We abstracted the estimated total number of cancer deaths in the US in 2020 from GLOBOCAN (the Cancer Mortality Database from the World Health Organization [WHO]) (https://gco.iarc.fr/overtime/en/database) for all cancer sites combined excluding non-melanoma skin cancer (C00-96/C44) (International Classification of Diseases, 10th revision [ICD-10]). Years of potential productive life lost (YPPLL) between 15 and 64 years of age were calculated for males and females separately and termed premature mortality to aid comparison with previous estimates using the HCA and FCA [11]. Lost production was valued using average gross annual earnings for the US, by sex and age group (15–24, 25–34, 35–44, 45–54, 55–64 years) and adjusted for unemployment and labour force participation (https://www.bls.gov/cps/lfcharacteristics.htm#unemp). The country-specific friction period was used to 'cap' the time for which lost productivity was valued. For comparative purposes, we estimated lost productivity using the HCA and we compared the results with the FCA capped at a 90-day friction period, following the literature [4, 9], and a 56-day friction period for the US in 2020. Further supplemental sensitivity analysis estimated friction costs using an average chain of vacancies multiplier of 2.21 taken from [5] and a Covid-impacted friction period in the US in 2021 (71.4 days), in addition to adjusting discount rates for the HCA between 0% and 6%. Costs were calculated in Microsoft Excel, discounted at a rate of 3% and expressed in 2020 US$.

3 Results

3.1 OECD Country Friction Periods over the Sample Period 2010–2021

As shown in Table 1, the average friction period in the five non-European countries (Australia, Canada, Korea, Japan and the United States) included in the sample was 61.0

days (SD 9.4) and this ranged between 44.8 days in Korea and 82.2 days in Canada. Variability in friction period estimates was relatively low, with the highest standard deviation over the sample arising in Canada (15.3 days). In general, friction periods were shorter at the start of the sample period compared with the end of the period; on average the friction period increased by 5.3% between 2010 and 2021. The sizable increase in friction period length in Canada, Korea and the US in 2021 (by 25.2% on average) was associated with the outbreak of the global Covid-19 pandemic (WHO first described the outbreak as a pandemic on 11 March 2020) and the impact of this global adverse macroeconomic event on the labour markets of countries.

The average friction period in the 12 European countries was 60.6 days (SD 14.8 days) and this ranged between 34.1 days in Switzerland and 137.3 days in the Czechia. Variability in friction period estimates was somewhat higher than in non-European countries, with the highest standard deviation arising in Czechia (96.5 days); four other countries had standard deviations > 10 days (Austria, Hungry, Luxembourg and the United Kingdom). Friction periods across European countries followed a similar trend over the sample period to non-European countries and grew by 5.5% between 2010 and 2021. The impact of the pandemic was also evident with an average increase in the length of the friction period in Europe by 15.8% between 2020 and 2021; in some countries this increase was considerably higher, for example in Austria (31.0%), Switzerland (26.7%) and Sweden (26.5%).

Figure 1 illustrates a flow chart of the approach to productivity cost analysis used in the study for the illustrative US case, and the data used and their related sources. Table 2 and Fig. 2 illustrate HCA and FCA estimates for cancer-related premature mortality costs per death in the US for 2020. FCA estimates were separated into conventionally used default estimates (90-day friction period) and updated current friction period to 2020 (56-day friction period) estimates. Our results revealed that the effect of basing FCA estimates on country-specific labour market data had a considerable impact on the derived productivity costs in the US in 2020. Cost estimates were over a third lower overall using the derived 56-day friction period, compared with the conventionally assumed 90-day period, and comprised 2.8% (compared with 4.6%) of the HCA estimate. Further supplemental sensitivity analysis (found in the electronic supplementary material) of the impact of an average chain of vacancies multiplier of 2.21 changed the results to 6.3% of the HCA estimate, while using the 2021 71.4-day estimate changed them to 3.6% of the HCA.

Table 1 Friction period estimates (in days) by OECD member country from 2010 to 2021

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Average	SD
Australia	53.0	52.7	52.1	48.7	49.0	49.9	51.4	53.1	56.9	56.6	–	–	*52.3*	2.8
Canada	–	–	–	–	–	70.1	67.6	73.5	79.2	79.9	94.4	110.6	*82.2*	15.3
Japan	–	–	64.9	–	–	–	–	78.1	–	–	–	–	*71.5*	9.4
Korea	41.4	41.0	41.8	41.8	40.4	42.1	43.8	42.9	43.2	39.8	39.7	56.0	*42.8*	4.3
United States	45.9	48.2	50.3	51.0	53.5	56.5	57.5	58.0	61.8	61.3	56.0	71.4	*56.0*	7.0
Average for non-European countries	*46.7*	*47.3*	*52.3*	*47.2*	*47.6*	*54.6*	*55.1*	*61.1*	*60.3*	*59.4*	*63.4*	*79.3*	*61.0*	9.4
Austria	42.9	42.3	41.3	39.7	40.2	41.2	46.9	55.0	62.3	61.5	58.8	77.0	*50.8*	12.0
Czechia	47.6	49.7	53.7	54.0	60.3	88.6	112.6	138.7	218.4	255.5	275.7	292.7	*137.3*	96.5
Finland	49.0	51.0	52.1	51.8	53.3	55.2	54.8	57.5	62.3	66.0	65.1	78.8	*58.1*	8.6
Germany	49.1	55.2	56.5	56.6	58.8	63.6	66.8	71.3	74.2	70.8	63.6	67.8	*62.8*	7.7
Hungary	41.4	56.1	48.8	57.1	70.0	69.1	81.2	78.0	77.0	65.4	58.1	55.5	*63.1*	12.3
Luxembourg	53.7	61.6	60.4	58.7	65.6	74.2	91.1	86.3	88.1	87.0	92.2	111.4	*77.5*	17.7
Norway	48.3	48.6	41.6	40.6	39.9	40.5	43.2	47.4	56.4	54.4	50.9	–	*46.5*	5.8
Poland	32.1	31.9	31.8	33.3	36.6	39.7	41.5	44.4	43.7	39.6	38.5	42.8	*38.0*	4.8
Portugal	36.8	31.9	31.6	35.1	36.9	35.1	34.2	35.1	33.4	32.4	31.9	36.3	*34.2*	2.0
Sweden	39.0	42.0	43.3	44.0	45.3	52.0	59.0	59.1	61.9	57.6	55.8	70.6	*52.5*	9.7
Switzerland	33.5	34.3	33.1	31.6	30.4	28.9	29.2	29.5	34.6	39.3	37.4	47.4	*34.1*	5.3
United Kingdom	66.5	65.5	64.4	63.7	61.1	62.5	72.1	75.0	77.4	79.5	90.6	94.5	*72.7*	11.1
Average for European countries	*45.0*	*47.5*	*46.5*	*47.2*	*49.9*	*54.2*	*61.0*	*64.8*	*74.1*	*75.8*	*76.6*	*88.6*	*60.6*	14.8

– indicates that sufficient data was not available to permit the friction period to be estimated, *OECD* Organisation for Economic Co-operation and Development, *SD* standard deviation

The italics are used to indicate average figures in the table by region

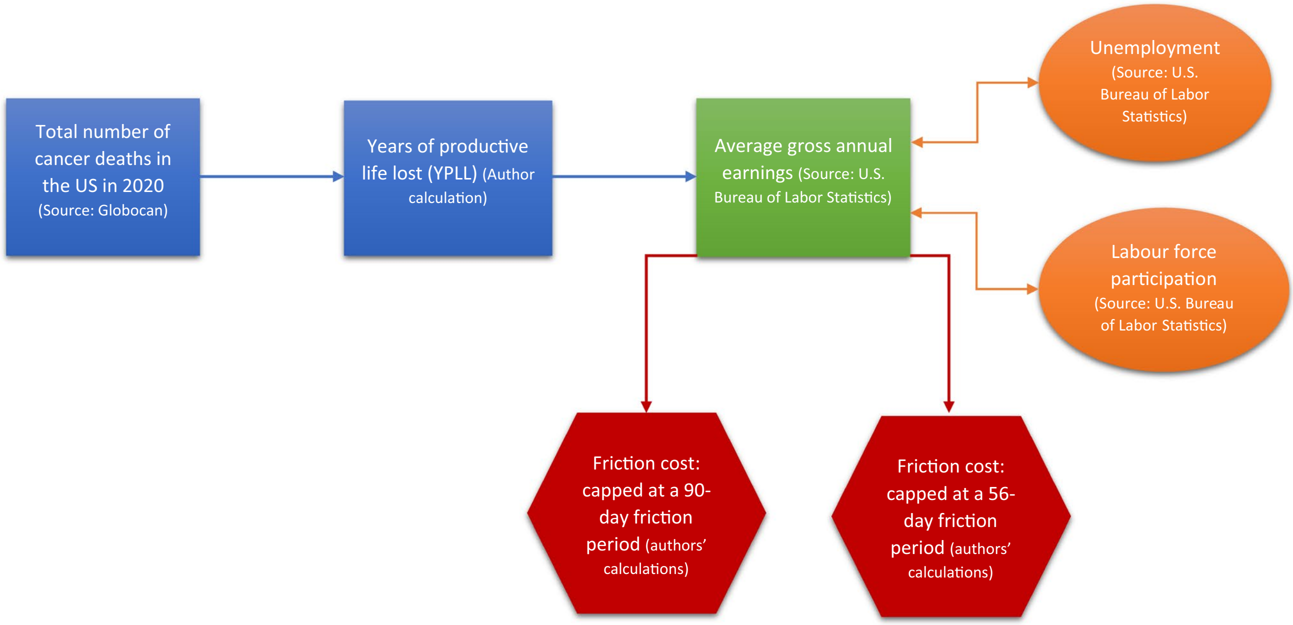

Fig. 1 Flow diagram of steps in the calculation of premature mortality costs for the United States

Table 2 Illustrative case—cancer-related premature mortality productivity costs in the United States according to the friction cost approach and comparison with the human capital approach (costs in 2020 US$)

	Age group (y)					
	15–24	25–34	35–44	45–54	55–64	Total
No. of cancer deaths						
Female	554	1996	6009	19,706	51,129	79,394
Male	798	1766	4164	17,246	60,447	84,421
Total	1352	3762	10,173	36,952	111,576	163,815
YPPLL						
Female	24,653	68,862	147,221	285,737	230,081	756,553
Male	35,511	60,927	102,018	250,067	272,012	720,535
Total	60,164	129,789	249,239	535,804	502,092	1,477,088
HCA—Premature mortality costs per cancer death [US$]						
Female	379,940	722,516	650,975	460,890	133,835	270,669
Male	428,989	809,603	975,239	678,704	205,401	357,020
Total	408,890	812,895	783,702	562,546	172,606	315,169
FCA: Standard 90-day estimate—Premature mortality costs [US$] per cancer death (% of HCA)						
Female	7741 (2.04)	11,315 (1.57)	12,732 (1.96)	12,998 (2.82)	12,511 (9.35)	12,585 (4.65)
Male	8318 (1.94)	12,450 (1.36)	15,902 (1.63)	16,604 (2.45)	16,136 (7.86)	16,069 (4.50)
Total	8082 (1.98)	11,848 (1.46)	14,030 (1.79)	14,681 (2.61)	14,475 (8.39)	14,381 (4.56)
FCA: 2020 56.0-day estimate—Premature mortality costs [US$] per cancer death (% of HCA)						
Female	4817 (1.27)	7041 (0.97)	7922 (1.22)	8088 (1.75)	7785 (5.82)	7831 (2.89)
Male	5176 (1.21)	7747 (0.85)	9895 (1.01)	10,332 (1.52)	10,040 (4.89)	9999 (2.80)
Total	5029 (1.23)	7372 (0.91)	8730 (1.11)	9135 (1.62)	9007 (5.22)	8948 (2.84)

FCA friction cost approach, *HCA* human capital approach, *YPPLL* years of potential productive life lost

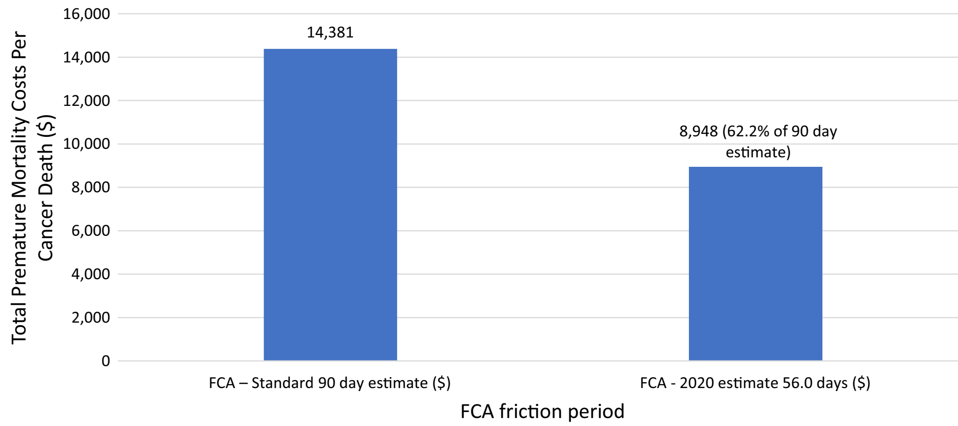

Fig. 2 Cancer-related premature mortality productivity costs in the US according to 90-day and 56-day friction period estimates (costs in 2020 US$). *FCA* friction cost approach

4 Discussion

This study presents national friction period estimates for 17 OECD countries calculated using routinely collected and reported national data. The results are country-specific, reproducible and can be updated overtime in line with changes in the extant macroeconomic conditions pertaining to each economy. They provide a unique and rich source of standardised estimates of friction periods that will facilitate greater choice in the selection of methodological approach to valuing the societal cost of illnesses across the sample of selected countries. In turn, they will aid in developing the FCA as a valid and practical alternative to the HCA for researchers conducting economic evaluations.

Traditionally, researchers considering the use of the FCA for productivity cost estimation have faced severe difficulties including a lack of empirical data on key labour market variables (including stocks and flows of vacancies) available in country-specific settings [3, 4]. Indeed, a recent review [4] indicated that the source of data for the length of a friction period for the majority of reviewed studies originated in the Netherlands; the Netherlands has a highly developed and open economy situated and trading in the European Union, and estimates are not likely to be transferable, or indeed a useful source of information for countries operating at very different stages of economic development or in different economic circumstances.

Our estimates of friction periods for 17 OECD countries between 2010 and 2021 revealed the diversity in friction period estimates that arise across different countries due to unique labour market conditions impacted by country-specific business cycles and indicate the necessity of incorporating this detail in the estimation of friction periods. For example, while the majority of studies in the literature use an estimate of 90 days as a default friction period [4, 9], our study has shown that this measure would considerably overestimate the length of time necessary to replace a worker in the United States, for example, between 2010 and 2021, leading to estimates of productivity costs that are markedly inflated. Our illustrative case highlights this point and indicates that a traditional estimate of the productivity costs associated with cancer-related premature mortality in the United States based on a 3-month friction period would overestimate the FCA cost by over a third in 2020 (90 days vs 56 days). The importance of this for robust economic evaluation which can be used to inform reimbursement decisions and the allocation decisions of scarce finances in the health sector is evident. This is of even greater importance given the magnitude of productivity costs compared with the direct costs associated with a range of illnesses [3].

Our results further indicate the need for up-to-date estimates of the friction period to accurately reflect extant labour market conditions and to capture the impact of global events on the macroeconomic underpinnings of an economy. For example, our friction period estimates tended to increase over the time frame studied and this is in line with findings from a previous European study which reflected a period of lower vacancy rates across the last decade [6]. Due to globalisation and harmonised business cycles, it is understandable that this trend is also reflected in estimates of the friction period outside of Europe in this study.

In addition, the sample period of this study includes the emergence of the Covid-19 pandemic globally that resulted in fundamental adverse macro-economic effects that we are still experiencing the effects of today [12]. Previous research has indicated the importance of taking into account changing macroeconomic conditions on the estimation of friction periods [7]. Labour market conditions immediately preceding the Covid-19 crisis were tight with strong job growth and falling unemployment rates experienced in the majority of developed countries [12]. The onset of the Covid-related crisis impacted adversely on labour demand and supply globally [12]. European countries in particular reacted by enacting policies aimed at encouraging labour hoarding to reduce the impact of firm-specific human capital loss; examples included expanding existing, or introducing new job retention schemes [13], which had an impact on job-to-job transitions during this period, and subsequently on the vacancy period of a job. This adverse labour supply shock caused additional friction in the labour market and increased the stock of vacancies arising in the majority of the countries under study. This is reflected in our findings which show a distinct growth in the length of the friction period experienced by countries in 2021 (25.2% longer in 2021 than 2020 in the case of non-European countries and 15.8% in the case of European countries). As this study illustrates, capturing the effects of these types of events is of the utmost important for the FCA.

A core finding highlighted by our study is the diversity in nomenclature used by the various national statistical agencies in the definitions for labour market vacancies and the diversity of methods employed to collect this data, all of which hinders the transferability and comparability of data across jurisdictions. We attempted to use only data consistent with a similar set of definitions and terminology; this process limited the range of countries that could be included in the sample and, even within this sample, differences were evident. The OECD's short-term labour situation database provided the core dataset upon which these findings are based. However, while European country data is well represented, for countries outside of Europe, we had to expand our data sources to include specific national surveys. The definitions used in these surveys to collect vacancy data are comparable but not identical, and are only available for selected years. For example, in the US, the stock of unfilled vacancies was measured by 'job openings', the definition of which includes a number of specific conditions which are similar to, but not exactly the same as, definitions used in European countries. Data on vacancy flow, as measured by job tenure, is available for a number of emerging economies from the OECD, such as Brazil, however, differences in the collection and definition of vacancy stock data precluded inclusion here. This holds true both in other emerging economies, and in developed economies.

A review of social costs measured in economic evaluations across different diseases reported that 2.2% of studies applied the FCA to estimate productivity costs [11]. This finding is at odds with calls for frictional accounting to be adopted rather than the human capital accounting for the estimation of illness-related productivity costs [14], a recommendation which is challenging to implement due to the lack of empirical estimates of the friction period. This study complements previous work in the area to expand the range of countries for which standard estimates of the friction period can be calculated [6] and provides an even greater range of sources for researchers to use in implementing the FCA in geographical regions beyond Europe.

Health economic evaluations generally entail a measure of the costs and benefits of a potential health intervention. Where a broad allocation of resources is deemed necessary, costs are generally more appropriately measured from a societal perspective. Heterogeneity in the approach to productivity cost valuation under this perspective has hindered the adoption of this broader welfare-based approach to economic evaluations in the past [3]. Consistency in methodological approach, regardless of valuation approach, is a priority and a minimum necessity to undertake valid and robust economic evaluations from a societal perspective. It has been suggested that the FCA generates more realistic productivity costs than the HCA, in the long run. This, combined with recent findings reporting that incorporating productivity cost into economic evaluations may positively affect cost-effectiveness outcomes in certain conditions [15], further supports our argument that up-to-date and accurate measures of the friction period are necessary to calculate FCA costs which can be included, along with conventional HCA estimates, in health economic evaluations from a societal perspective.

Our study contributes to this in two ways: firstly, by expanding the range of countries for which the FCA can be applied; and, secondly, by using national routinely collected data, our estimates are reproducible and can be updated over time for OECD member countries. We moreover highlight the impact global macroeconomic events, such as the Covid-19 pandemic, can have on the length of the friction period in a country due to their effect on a country's macroeconomic and labour market conditions.

The limitations of the study include the somewhat diverse nature of the sources used as estimates expand beyond the European region, where both data collection methods and definitions of key labour market variables can vary. External validation of the vacancy data is difficult due to a lack of similar comparator measurements on a national basis, however, the impact of potential vacancy data under-estimation should be somewhat negated by the use of vacancy measurements in both the numerator and denominator of the vacancy duration formula. As others have shown [8, 16], friction periods by occupation, industry, gender or education can vary. However, sufficiently robust data to calculate comparable estimates across countries was not available. Future individual country FCA studies, for example in the United States, may be able to generate estimates in greater sectoral detail. Previous studies have shown, for example, that friction periods varied between occupational classifications and were higher in senior occupational roles than in lower-level occupations [8]. In addition, we would advocate that future studies attempt to capture local estimates of the time required to advertise a job and to provide initial training, which was assumed to be 4 weeks in this study in line with previous literature, in order to further enhance the accuracy of the friction period across countries. We would urge researchers to continue to report up-to-date estimates of the friction period on an annual basis over time to reflect the extant labour market conditions in a country, particularly as the effects of the global pandemic recede and a new set of labour market and macroeconomic conditions emerge. Recent developments include the emergence of higher inflation levels, with economic institutions predicting a fall in gross domestic product growth globally in the short term and higher unemployment levels [17]. With an assumed negative relationship between the vacancy rate and the unemployment rate, this could lead to further increases in the friction period in the short term. Finally, we would also recommend that in countries where only limited evidence is available to estimate friction periods (e.g. in the case of Japan in this study), use could be made of existing labour market data, such as unemployment rates, to adjust the single-year figures produced here.

5 Conclusion

We have developed national friction period estimates for 17 OECD countries using routinely collected and reported national data. These results expand the potential application of the friction cost approach outside of Europe and will support greater utilisation of the FCA and wider inclusion of productivity costs in societal-based economic evaluations.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s40273-023-01261-y.

Declarations

Funding None.

Conflict of interest There are no conflicts of interest for any of the authors.

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Availability of data and material All data generated or analysed during this study are included in this published article.

Ethics approval Results are based on secondary data sourced from international organisations and do not require ethical approval.

Author contributions: PH: conceptualisation, data curation, formal analysis, methodology, investigation, visualisation, writing—original draft, writing—review and editing. MOO: conceptualisation, methodology, visualisation, writing—review and editing. AP: conceptualisation, methodology, writing—review and editing. MdCC: conceptualisation, visualisation, writing—review and editing. IS: conceptualisation, methodology, writing—review and editing. LS: conceptualisation, methodology, visualisation, writing—review and editing.

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