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Are European health models still different?

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Abstract

This paper discusses the applicability of the traditional classification of welfare systems described in *Three Worlds of Welfare Capitalism* by Esping-Andersen (1990) when applied to the health sector in Europe. To this purpose, we use a cluster analysis on 26 European countries from 2001 to 2021, to identify, if any, distinct health models. Our main findings suggest that, in Europe, the original typology of Esping-Andersen is hardly confirmed, and sometimes dismissed; second, in certain cases, only an Eastern European model emerges; third, a neat separation between the Nordic and the Continental model disappears, giving some evidence, in Europe, of a weak form of convergence of health systems driven more by economic constraints than by political and social attitudes.

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1 Introduction

This paper discusses the validity of the traditional classification of welfare systems described in *Three Worlds of Welfare Capitalism* by Esping-Andersen (1990) when applied to the health sector in Europe. In the well-known original contribution, Esping-Andersen distinguished between three basic models of welfare states: a social democratic model with high levels of decommodification (exit from the labour market with little or no loss of income), cross-class solidarity, and wide universalism leading to equality of the highest standards; a liberal or Anglo-Saxon model, characterised by low levels of decommodification, private solutions to welfare provision, and the predominance of the market logic; a conservative or Continental model, defined by occupationally-determined solidarity and oriented toward the preservation of traditional family structures (Pierson, 2006; Carreira Da Silva, 2017).

Since then, a vast literature has developed with the aim of either confirming, extending or criticising the original model; furthermore, other classification criteria have been developed over time, with the aim of extending the Esping-Andersen's focus on decommodification.[1] One early result of this extension was in Castles and Mitchell (1992), where a distinction was made within the set of countries belonging to the original liberal welfare state model, raising doubts whether New Zealand, Australia and the United Kingdom could belong to that set. A second result can be traced back to Leibfried (1993), who introduced a Southern European welfare state including Portugal, Spain, Greece, Italy, and to a less extent France, whose characteristic - at that time - was trying to chase the Nordic model (Pierson, 2006; Ferrera, 1996).

Over time, the debate was fuelled by new results and extensions, but it is still far from being exhausted. As recently suggested by Powell et al. (2019; 68) in their review, the evidence of the three-world typology is at best mixed, and basically no country reaches the pure 'threshold' defined by Esping-Andersen. Of little help, in this case, is the practice of observing countries in a limited time frame, and the attempt to consider the overall welfare state, in this way neglecting possible specific characteristics of the individual elements of welfare systems (e.g., the case that some countries may 'belong' to a model for, say, health, and to another model for, say, education). This possibility suggests that

[1] An early survey of the state of the art, where different worlds of welfare state were described and discussed, is in Arts and Gelissen (2002). See also Ferragina and Seeleib-Kaiser (2011); Danforth (2014); Emmenegger et al. (2015); Saint-Arnaud and Bernard (2003).

a more proper analysis should be carried out on specific items of the welfare state and for long periods, which make possible to investigate how many times countries converge to a given model for different layers of the welfare state.

In this paper, we add to this literature by following an articulated approach to the classification of welfare states. First, according to what we think a more appropriate method of analysis, we focus on the health sector, rather than on welfare states as a whole. Health spending is a significant share of overall public social spending, and - after pensions - usually the most important spending item in most advanced economies. In 2022, the OECD average health spending is about 9.2 per cent of GDP; while in Europe the same figure is just below 8 per cent of GDP, for the most part involving hospital services. Thus, health spending is of interest by itself, to the extent that it absorbs an important amount of public resources mainly through taxes and social contributions. But, as it was argued by Moran (2000), nevertheless the debate about health-care policy should be central to our understanding of the contemporary welfare state, the literature on healthcare policy is often semi-detached from the wider literature on the welfare state; and though health is recognised by many studies as an important component of welfare provision, it is surprising that health policy may still be "at the corner of their eye rather than in the centre of their vision" (p. 136).

Second, we will analyse the evolution of the health sector from 2001 to 2021, in order to avoid spurious classification due to the consideration of specific years, and to obtain the most up-to-date information as possible. We think that the length of the time period may be an important characteristic of the analysis, particularly after the serious economic crisis of 2008, which has induced a diffuse recalibration of most public spending, including social spending, in many countries. Using years before and after the crisis, would allow to capture possible changes.

Third, our study is focused on 26 European countries, all countries for which sufficient data are available. We think that to limit the analysis to European countries only is particularly fruitful in terms of empirical evidence for at least two reasons. The first is that in the original Esping-Andersen typology, European countries were not grouped into a single cluster, but distributed across the Nordic (Scandinavian), Anglo-Saxon liberal and Continental conservative models. After the introduction of a Southern European model, countries were further split. Thus, an up-to-date analysis may be of interest to the extent that it aims at verifying whether this distribution can survive to recent developments in health provisions, or, rather, whether the grouping of countries might have

become relatively less distinct because of the convergence pressures exerted by the economic system and by other external factors. Thus, the investigation of what has happened in Europe may give insightful information on how recent economic trends may have shaped and still shape the health sector. The second reason is that the process of integration occurred in Europe in recent years has induced a gradual recalibration of member states' welfare programmes, which might have resulted, to varying degrees, in some forms of downsizing of national social policies.[2] This outcome, to some extent, may derive from integrated economies that have become open more rapidly than institutions have adjusted to integration; a feature that makes the achievement of country-specific objectives harder. Also, following the onset of economic crisis of 2008, there is the impression that the room for national decision-making in social services has decreased, also because EU's recommendations were aimed at enhancing efficiency and at consolidating public budgets, giving rise to a possible social competition eventually leading to some forms of convergence of welfare state provisions (Alsasua et al., 2007; Bilbao-Ubillos, 2023). As also reported by Vaughan-Whitehead (2017; 25), spending cuts, especially of in-kind benefits, were massive in health after the crisis of 2008, with stricter accession rules and systematic introduction of co-payments.

Accordingly, a natural question arises as to whether the health sectors of the European countries may have converged (or are converging) towards a 'unique' or 'similar' health model as the outcome of various external and internal constraints. In order to investigate this issue, and following a wide practice in this field, we develop a cluster analysis to identify specific patterns within a complex dataset including variables associated to the various dimensions of health. The main findings are mixed, and this is a finding in itself. They may be summarised as follows: first, there is some evidence that the corridor in which European health systems are displayed has become narrower, as the original typology of Esping-Andersen is at the best only partially confirmed, and sometimes dismissed; second, in certain cases, only an Eastern European model emerges, with marked differences with respect to the other two clusters; third, the other two clusters, when distinct, are relatively more homogeneous, signalling some weak form of convergence; finally, by excluding the countries admitted in the European Union in 2004, the separation between Nordic and Continental models completely disappears, while a Southern European model (including France) comes out.

[2]For various opinions on this issue, see Abrahamson (2010).

2 Background: Health and Europe

The process of integration occurred in the European Union, and more in general in Europe, in the last decades has induced a gradual redrawing of member states' identities, which might have resulted, to varying degrees, in a downsizing of national social policies. To some extent, the perception has developed that the welfare state and the internal market have become incompatible. Whether this incompatibility will occur on a programmatic base (in the short term) or on a systemic base (in the long-term) has long been the subject of debate (Pierson, 2001).

But, as some authors have recently argued, from the onset of the crisis in 2008, with the associated sovereign debt problems, the room for national decision-making has decreased, and the pressures to 'review' the social protection systems have amplified (Bilbao-Ubillos, 2023). Thus, it is not a surprise that since the time of the crisis, the EU's recommendations were aimed at enhancing efficiency and at consolidating public budgets in all European countries. In the last two decades, this framework has contributed to separating the field of social policy from that of economic policy (Barbier, 2018; 321), with the only possible touch point being a form of social policy oriented to the functioning of the labour market (for an earlier view, see Streeck, 1995). This perspective represents a break from previous visions of the economic policies, at least until the Seventies, to the extent that social policy was guided by needs rather than by ideological preferences and - we can say - external constraints (Panic, 2003; 83).

As Copeland and Daly (2018) also argued, an agreement among member states over the most appropriate social policy is lacking, and it was already very limited before the crisis.[3] Furthermore, the process of fiscal consolidation that followed the crisis may have accelerated this process of cost containment, inducing a sort of social competition (Vaughan-Whitehead, 2017; 12; Maslauskaitė, 2013).

Health is not an exception to this process, as economic globalisation, enhanced economic competition, demographic changes, labour market shifts reducing opportunities for the less-skilled, scarcity of economic resources, are all common pressures potentially inducing health policy convergence in spite of historically and culturally different member states' attitudes. The role of these factors is amplified by the asymmetry that in Europe characterises health policy, caused

[3] Hassenteufel and Palier (2015; 126), for example, shows that France has been more and more obliged to follow EU timing and recommendations.

and justified by the exclusive health competence of the member states. However, it should be highlighted that according to the Treaty of the Functioning of the European Union (TFEU), the EU has to ensure a high level of human health protection "in the definition and implementation of all Union policies and activities" (art. 168), with the competence "to carry out actions to support, coordinate or supplement the actions of the Member States" in protection and improvement of human health (art. 6).[4]

To the extent that the reactions to these pressures will differ across countries, a European social model might not emerge; on the other hand, since the external pressures have the nature of a symmetric shock for all European countries, there may be a tendency to converging strategies in providing health care. A common health regime may thus develop not as an outcome of a precise institutional and political choice, but as a consequence of external constraints.

Whether this will result in high-level health provisions or in a tendency towards a minimum standard, is not easy to disentangle. Yet, in light of the likely disparities across EU countries in the willingness to pay for health and in the attitude to pursue redistributive policies, the development of a EU-level framework in health will be at least challenging (as it was also argued by Mossialos et al., 2010; 22).

What has been observed so far does not seem to be going in a different direction. Indeed, subtle - and often not visible - forms of downsizing have been in operation in the recent past. One common way has been to defund the health sector, which does not necessarily mean decreasing resources. To this regard, it is worth noting that the empirical evidence of an almost stable level of public spending over time does not in itself prevent a downsizing process; rather, it may simply represent a sort of 'rescaled stability', involving increasing difficulties in financing new health needs (see also Mishra, 1999, 38) or in financing them at a lower scale.[5]

Another leading way to retrenchment - from a more institutional perspective -

[4] In addition, it is important to remind that the Charter of Fundamental Rights of the European Union (with the same legal value as the EUFT), art. 35, states that "Everyone has the right of access to preventive health care and the right to benefit from medical treatment under the conditions established by national laws and practices. A high level of human health protection shall be ensured in the definition and implementation of all the Union's policies and activities". Furthermore, the European Social Charter, signed in 1961, part 1, no. 11, states that "everyone has the right to benefit from any measure enabling him to enjoy the highest possible standard of health attainable".

[5] For an analysis of the wide diffusion of unmet health needs in 29 European countries, see Carnazza et al., 2023, where it is clear that health care problems may derive from institutional factors mostly traceable to defunding practices.

has been to distribute the responsibility of health provision to more decentralised bodies, which may imply less resistance to veto points and a weakening of pro-welfare groups induced by political interference (Jensen et al., 2019). Added to this is the frequent convenience of politicians to resort to supply-side measures - such as spending cuts - to stimulate the economy in recession.

Finally, non-decisions may also count as a downsizing, which supports the idea that a 'stable' health system - in terms of resources - may not imply an 'evolving' health system in terms of protection.

All these factors highlight that the repertoire of national policies that were available before the Nineties in many European countries may have shrunk. As a consequence, the narrower budgetary margins national tax policies have to deal with may have reduced the generosity and increased the tightness of eligibility rules, possibly leading to a homogenisation of national health sectors and a convergence towards lower standards, characterised by an increasing share of private provision, tax subsidised private financing, and means-testing access rules. These latter, as reminded by some authors, are likely to undermine the popular support for health to the extent that an increasing part of the population would pay for services they cannot use. As argued by Korpi and Palme (1998), means-tested policies may fuel problematic debates about the deservingness of welfare state beneficiaries and create a polarisation between them and the taxpayers.[6] Furthermore, to the extent that this process can promote trust in "do-it-yourself" policy solutions, healthcare may no longer represent an essential part of the social contract between citizens, with the likely consequence of a weakening of universalism.[7]

This process, however, would not necessarily lead to a total dismantling of the health sector; yet, it might lead to a lowering of standards, which would introduce anyway a large gap with both the inspiring economic principles of the second half of the past century and with the concept of welfare state as a political project (Palley, 2018).[8]

To this respect - and also due to the growing presence of the market in the

[6] See also Brady and Bostic (2015).

[7] As also argued many years ago by Marshall (1964; 237), the welfare state can be thought of as the promoter and guardian of the welfare of the whole community, which is something more complex than the sum total of the welfare of all its individual members arrived at by simple addition.

[8] See also Bertin et al. (2021; 1), arguing that the beginning of this century has witnessed the redefinition of welfare systems and undermined their original logic; this also has led to question the original classification by Esping-Andersen (1990) towards more hybrid welfare systems.

health sector - it is likely that politics will not oppose a decay of the health sector. As argued by George and Miller (1994), political parties often differ only with regard to the degree of reluctance they follow this policy stance, and – more importantly – they are often insulated from assuming the full responsibility in front of democratic pressures to act otherwise, concealing the policy action behind the veil of expert opinions, and following the logic of an 'affordable' welfare state as a point of convergence.

Thus, even though in health care the principle of universal coverage is in principle more resistant to erosion, governments often employ more indirect methods to whittle down the size of the health systems, as higher charges and fees, reduced services, a decline in the quality of services, and privatisation (Mishra, 1999; 47). It follows that, especially in those European countries where health is a consolidated need, downsizing has to be piecemeal and could require various strategies of concealment and subterfuge (Pierson, 1994), as well as a certain period of time. A process of convergence may therefore occur, notwithstanding the fact that the competence of European countries is 'jealously guarded' (Rothgang, 2021; 517) and that the tendency to supranational regulation of health issues is likely to have been weakened after 2004 (the Eastern Europe enlargement). On the other hand, as internal constraints, there are indeed a number of health factors that are subject to European legislation, which may contribute to a greater convergence of health systems despite different starting points (Abraham and Lewis, 2000, especially with regard to the regulation framework of European countries; Jensen, 2008, 159; Castles, 1999); so much to suggest that public health care might perform badly as a proxy of welfare state regimes (Jensen, 2008; 160). On the other hand, what happens in the health sector, given its economic relevance, may only anticipate a tendency that could become proper of all elements of the welfare state.

To some extent - not negligible for the potential consequences - this process may lead to a sense of disenchantment with democracy, as citizens are likely to find that no matter what party they elect at national level, health (and social welfare) policies will be dictated by external factors without direct accountability. This may further contribute to watering down the concept of health care, to favour a lowering of health standards, and to detach the health field from the economic field in political decisions. As Dukelow and Kennett (2018) argued, for example, the Esping-Andersen's (1990) idea of decommodification as the way to remove the elements of dependence of individuals on the market, has been progressively eroded. Already in Pierson (2001), it was clear that those

elements of the welfare state that protect workers from market pressures had been dismantled, especially in liberal welfare states where tax credits, workfare and subsidies for accessing social services became widespread tools, often locking people into a cycle of low wages, debt and housing insecurity (Dukelow and Kennett, 2018; 6). This would prevent, as some authors have argued in the past, the plausibility of any distinct economic theory of welfare policy (Skocpol and Amenta, 1986; 134-137).

The underlying idea of convergence that stems from this framework, in any case, is not completely new, even though it has not been proved – as we try to do in this paper – in the context of a cluster analysis. Depending on the specific measure used, some studies have indeed argued about the convergence of public healthcare spending across European countries driven by similar economic conditions and policy ideas (Schmid et al., 2010; Schmid and Wendt, 2010). A partial – and to some extent wider – support to this hypothesis also comes from Castles (2004), using 21 OECD countries for the period 1980-1998, with specific reference to the consequences of globalisation and population ageing, suggesting the emergence of a specific European 'social' model. Some forms of convergence of privatisation trends in health sectors has also been observed (Hacker, 2004; Poullier, 2004), as well as the fact that cross-national diffusion of medical knowledge, new drugs, and medical equipment – with respect to the past – may push towards similar spending levels (Leidl, 1998), also as a consequence of a convergence in economic growth (Hitiris and Nixon, 2001).

3 Models of health systems: a review of the available empirical evidence

The hypothesis of convergence of health models in the European Union, if verified, would disprove the traditional worlds of welfare states proposed by Esping-Andersen (1990). Indeed, the available analysis of health systems hardly reflects that partitioning of countries. One reason is that his decommodification concept was mainly used to analyse labour market participation (especially in part 2 of his book), with the aim of investigating whether individuals could maintain a socially acceptable standard of living regardless of their market

performance (see also Esping-Andersen, 1987; 86).[9] The huge literature that has since then developed – either confirming or enlarging or criticising the original classification – has rarely included health services (an exception is Kangas, 1994, on health insurance for 1950 and 1985) whose essential nature is to be provided mostly in kind, with a tendency to universal coverage, and mostly irrespective of labour market participation (Rothgang, 2021; for a recent review, Powell et al., 2019).

But even when the whole welfare state is considered, evidence of the original three-world typology is at best mixed; as suggested by Powell et al. (2019; 68) in their review, most of the nations are placed in the same group by only around 50 per cent of the studies, with basically no nation reaching the pure 'threshold', an outcome that recalls the Kasza's (2002) assertion about the 'illusory nature' of welfare systems (after including Japan in the analysis), and the statement by Burau and Blank (2006; 74) about the fact that only few countries match the ideal type – and some even emerge as hybrids – when analysing the institutional contexts of health policy.

Furthermore, there is also a limited knowledge of how welfare regimes evolve over time and whether and how countries originally belonging to different groups in Esping-Andersen classification may later result in other groups giving rise to a form of hybridisation of welfare regimes (Bertin et al., 2021). Thus, while the practice of welfare modelling has been very successful over the last decades, there are still significant gaps that remain to be filled (Powell and Barrientos, 2015;

[9]The reason why workers and decommodification have been the focus of the analysis becomes clear by his statement about the irony of the 'free market' as a mechanism its actors cannot escape from (Esping-Andersen, 1990; 86); and when he interprets social policy as an intrinsic social transformation, instead of being defined by a mere volume of social spending (Esping-Andersen, 1987; 85). Arguments that, to some extent, have a reference point in Polanyi (1944) and his assertion that capitalist markets transform everything into commodity form. It is however worth noting that the first attempts to classify welfare states were by Wilensky and Lebeaux (1965), termed *residual* and *institutional* models, later used by Pinker (1971) and Titmuss (1974), defining the two models as two ends of a continuum of social welfare activities (Higgins, 1981; 42).

245). If any, earlier typologies of health systems have been attempted by Field (1973) and Terris (1978). The former assumes particular relevance for our study, as in defining health as a set of commitments and resources any society devotes to health as distinguished from other forms of public spending, a hypothesis was maintained of a convergence of health systems of industrial societies "in the light of such fairly universal factors as scarce resources, increased demands for services and technological constraints, and in spite of idiosyncratic historical antecedents and cultural differences" (Field, 1973; 764). This convergence, according to the author and observed in 1900-1970, would occur "in spite of widely different cultural and historical backgrounds and a variety of types for the management and organization of health services in different societies ... and in their response to roughly similar socio-political forces and technological factors" (Field, 1973; 778).

Some years later, instead, Terris (1978) proposed a three-world classification of the health systems on the basis of some qualitative indicators, distinguishing three basic structures (public assistance, health insurance, national health services) and allowing for some intermediate forms. Even though his classification and grouping of countries hardly resemble the pattern of the original Esping-Andersen classification, OECD (1987) – in proposing its own classification – relied on similar typologies, when distinguishing between National Health Service (NHS) systems, Social Insurance (SI) systems and Private Systems (PS). Furthermore, it is worth noting that there may be significant differences between the way of providing health care and the ideal types of welfare regimes.[10]

Rather, as argued by Bambra (2005; 33), by trying to extend the decommodification concept to cover health care, the resulting classification could be used to supplement other welfare state typologies. This also paves the way to a

[10]Ginsburg (1992; 28), for example, argues that welfare states are uniquely shaped by their political, cultural, social, and economic context within a nation state.

number of studies suggesting that a separate analysis of specific welfare state provisions might be of more help in highlighting different internal arrangements of welfare regimes, given that not all elements of welfare state can be reasonably assumed to follow the same trail over time. Each welfare policy, indeed, may have different growth profile, different histories, different political attitudes, different absorption processes of international constraints and experiences. This could lead to some inconsistencies of the welfare programs that may increase with their age of implementation (Kasza, 2002; 282). The pitfalls of comparing the structure of welfare states may indeed be debatable (Seeleib-Kaiser, 1995), even though doing comparisons in one specific field may run the risk of neglecting important functional equivalents with other welfare segments. On the other hand, policy-specific research – as in our case – may contribute to provide a more explanatory framework than the use of a global concept (Kasza, 2002; 284), a suggestion previously formulated by Alber (1995;132); a shift of the research agenda towards the analysis of social services rather than only of social transfers, he argued, is needed – already at that time – because of the growing proportion of people of very advanced years who need care and of the decline of the caring capacities of families in the context of declining birth rates and growing female employment. In this vein, comparative research should try to consider as much as possible the full character of a welfare regime by examining as many specific aspects as possible.[11]

Gaimo and Manow (1999; 1992), for example, after examining health care reforms in Britain, Germany and the United States, show that the downward spiral towards privatisation of risks in health care has not occurred, and that

[11] Frenk and Donabedian (1987), based on ownership and financing; Bambra (2005) and Moran (2000), suggesting different degrees of public intervention in health consumption, provision, and technology to define a 'health care state'. See also Wendt et al. (2009), suggesting three governing features: financing, provision, and regulation; Reibling (2010); Bertin et al. (2021), suggesting that specific policy areas may show a classification that is not in line with standard classification.

countries have not converged on a common reform path. Rothgang (2010; 246), instead, notes that a kind of convergence may be observed for OECD countries as a whole, where the public-private mix shows both beta- and sigma-convergence, leading healthcare systems towards more hybrid forms. The same opinion is to some extent shared by Swank (2002; 230), where it is argued that significant "retrenchment and efficiency-oriented reforms have occurred in old-age pensions, income supports for the working-age population, and health care and social services". Bertin et al. (2021; 6) also show the absence of a 'pure' overlap between the welfare worlds of Esping-Andersen and their healthcare typologies, suggesting that health systems are more hybrid than the standard classification would suggest (see also Reibling et al., 2019). This is why, in our work, we try to extend this approach by including as many variables as possible for as many European countries as possible, for as many years as possible in this century, in the attempt to overcome the unidimensional static perspective used in other studies. We postpone to Section 5 a more detailed comparison of our results with those of similar studies using the same technique.

4 Methodology and data

4.1 Methodology

The quantitative literature on classification of health regimes has made extensive use of the cluster analysis. Notwithstanding this analysis requires a number of decisions that may be thought as critical, the advantage of being able to systematically account for a great number of variables when assigning cluster membership has proven very useful. One fundamental reason is that the understanding of different welfare state regimes often requires to explore multi-dimensional facets

that can hardly be collapsed to a unique indicator easily comparable across countries. Furthermore, in the attempt to preserve this multi-dimensionality, it must be taken into account that countries that appear similar in some of these dimensions may differ in others. When multi-dimensionality is an issue, the property of cluster analysis of grouping countries in terms of internal cohesion (homogeneity), while at the same time making clear the nature of the external isolation (separation), is a value added to categorize welfare states (Obinger and Wagschal, 1998; Kautto, 2002; Powell and Barrientos, 2004; Jensen, 2008; Wendt, 2009; Wendt, 2014; Minas et al., 2014; Reibling et al., 2019). Also, Gough (2001; 169) describes cluster analysis as 'robust, meaningful and simple' and particularly recommended for the analysis of welfare regimes. In other contexts, Witt et al. (2018; 21), also argue that a cluster analysis may serve the scope to investigate complex and interrelated dimensions of nations "as a foundational tool for sense-making and conceptualization of the object under investigation"; or as a way to allow the data to speak for themselves (Ermakoff, 2019).

As usual in the cluster analysis, in order to avoid that the variables measured in different units may have an impact on the dissimilarity matrix, we choose to standardise all variables by a z-scoring technique. According to this technique, a new variable is defined by dividing the difference between the original variable and its mean by the standard deviation of the same variable. It is worth recalling that after z-scoring the variance of the new variables will be equal to 1, which can be viewed as a special case of weighting defined by the reciprocals of the sample standard deviation. This implies that, by adopting a z-score technique, the importance of a variable (its weight) decreases with increasing variability.

With regard to the clustering method, the bulk of the analysis is carried out by using a hierarchical agglomerative clustering, which, in our case, implies a

series of successive agglomerations of n countries into groups, with the initial step being n single-member 'clusters'. The disadvantage of this method is that when an agglomeration step has joined two countries, they cannot be removed in the following steps (Kaufman and Rousseeuw, 1990).

With regard to the dissimilarity measure, our analysis will be mainly based on the squared Euclidean distance, even though other distance measures are experimented in order to test the robustness of clustering, and on the use of the average linkage, by which the distance between two clusters is the average of the distance between all pairs of countries from each group. Also in this case, different linkage methods will be used. As a final point, a decision must be taken about how to define the optimal number of clusters. To this purpose, the most common and reliable stopping rules are those proposed by Duda and Hart (1973) and by Calinski-Harabasz (1974), based, respectively, on a pseudo T-squared test and on a pseudo F-test (see also Milligan and Cooper, 1985).

4.2 Data and variables

The data used in this analysis comes from a number of sources: the OECD Health Statistics for 2023; the ESSPROS database; the WHO database; the Social Insurance Entitlement Dataset (SIED). Data are collected for 26 European countries for the period 2001-2021, but not all countries are observed in all years. Exceptions are: Iceland (observed in 2005, 2010, 2015, 2020); Estonia (observed from 2007 to 2021); Luxembourg (observed in 2010, 2015, and 2020); Norway (observed from 2008 to 2021). This gives rise to an unbalanced panel dataset.

The variable used in this paper try to take into account various dimensions of the health sector, as follows. In order to overcome the observation that health spending alone is not able to significantly identify health regimes because of the

uniform tendency across countries to spend the same portion of GDP on health (Jensen, 2008; 159), we introduce a set of health indicators to take into account the various elements of differentiation in health provision, as also indicated by the OECD classification of health data.[12] Furthermore, the variables have been chosen in order to cover the period from 2001 to 2021 for 26 European countries without significant gaps.[13] The analysis will start using those variables allowing to keep all 26 countries; alternative analyses will be developed to take into account variables excluding one or more countries. The variables used are described in table 1. Descriptive statistics are not presented here, as they will be commented for each cluster in Section 6.

Looking at the disaggregated data will in principle allow to distinguish – if any – welfare state structures in terms of the various dimensions (Kuitto, 2011; 350).

With regard to **health expenditures**, despite the well-known critics to the power of this indicator to discriminate between health systems and to give rise to misleading comparisons of welfare systems (Esping-Andersen, 1990; 2), it is worth noting that this variable provides an important information about the share of the public resources that are devoted to health, even though it cannot properly reveal about the intensity and the quality of health care across different countries (Huber and Stephens, 2001). Yet, and at least to some extent, health expenditures can embody the labour-intensity nature of medical services and the different dynamics of their prices with respect to the overall price index, the possible increasing costs of technological product innovations, especially in certain medical areas, even though at a non-uniform rate (Sorenson et al., 2013; 228), the stimulus to additional demand of therapies caused by the success

[12] For long time, studies on welfare state changes often relied on public spending as a proxy for the welfare state effort, although it was known that aggregate spending was theoretically unsatisfactory (Castles, 2002; 616). Scoring welfare state on spending implies that all spending counts equally (Esping-Andersen, 1990;19).

[13] Occasional gaps (missing values) have been filled by extrapolating the observed series.

of medical treatments and by the increasing number of old-aged chronically ill patients in a sort of growing expenditure cycle, at least for long-term care (Zweifer et al., 2005; Breyer and Lorenz, 2020). Finally, as also observed by Rothgang et al. (2010), the use of public health expenditures (and its proportion to total spending) may reveal some forms of 'indirect' privatisation of the health system.[14] Overall, as also suggested by Freeman (1999), the public funding of health care is often seen as an important characteristic of the public involvement in health care (see also Burau and Blank, 2006; 65), which is conditioned, in more recent times, by the widespread use of diagnosis-related groups (DRG) developed to assess the costs of health care. If true, this would contradict the idea of institutional theorists that health care systems may be path-dependent for cultural and historical reasons (Rothgang, 2021), and would even agree with the earlier position of Field (1973).

As a complement to health expenditures as a percentage of GDP, we also choose to consider a set of other variables (see Sowula et al., 2023, for Sweden and Germany). In particular: means-tested and non means-tested cash benefits; means-tested and non means-tested in-kind benefits; household out-of-pocket payments in percentage of GDP; private sector expenditures in percentage of GDP; public pharmaceutical expenditures in percentage of total health spending. All these variables are included in order to identify possible dissimilarities in specific areas of public spending, and in the way in which the financing of health care makes recourse to private resources.

In particular, introducing cash transfers in our analysis can reveal the terms on which individuals can make claims on public resources and the type of solidarity which are fostered by systems of public support. Also, the way in which cash transfers are organised also reveals the priorities the action of governments

[14] See also Bambra (2005), constructing a health decommodification index on the basis of private health expenditures and private hospital beds.

is based upon (Daly, 1997). Furthermore, the observation of cash and in-kind transfers in the last twenty years may embody the outcome of reforms possibly restricting the access to benefits by tightening conditions and regulation; or reforms aimed at increasing the use of means-testing and at replacing universal payments; or, finally, reforms favouring the growth of private sectors in terms of contracting out services.

But in order to understand the possibility of convergence of health sectors, it is necessary to complement the previous information with some characteristic of the **health protection** category, to take into account not only the generosity in monetary terms, but also the institutional architecture, including access requirements and duration of the sickness benefits, as a proxy of decommodification of the labour market. The consideration of the institutional structure can indeed overcome the limit represented by the level of social spending, as an increase in social spending may not be necessarily correlated to program extensions, and different countries may have followed different paths. To this purpose, we include four variables in this set: the gross 26-week replacement rate for sickness provisions; the amount of weeks during which sickness benefit is payable; the number of "waiting days" of sickness at beginning of sickness spell when no benefits are paid out; and the coverage ratio of sickness benefits as a proportion of the labour force. What is expected, according to our maintained hypothesis, is that patterns of spending across countries may converge, by this way contributing to a wider convergence of other elements of health systems.[15]

With regard to **health resources**, we use two main indicators: total health employment, and the number of beds in publicly owned hospitals. In particular, the use of total employment can be interpreted as a complement to the crude level of health spending; as argued by Wendt and Kohl (2009) there may be only

[15]See Barros (2007) for a less visible convergence in funding; see also Leiter and Theurl (2012), showing convergence for 22 OECD countries and also for subgroups of countries.

a weak correlation between the financial resources invested in a nation's health and the level of health employment, which suggests to take into account total employment when attempting to build healthcare system types.

With regard to **health care utilisation**, we make recourse to inpatients discharges and to the average length of stay in hospital. To some extent, these two variables can all provide information about the 'indirect privatisation' of the health service. As shown in some studies, this does not necessarily imply lower prices and more quality. Braithwaite et al. (2011), by reviewing a large number of articles, have shown a weak and at time conflicting evidence, while Tiemann et al. (2012) have also shown that private hospital ownership is not necessarily associated with higher efficiency for the case of Germany.

Concerning **health quality**, there is no wide choice among indicators allowing to cover the whole period for all countries. One possibility - with gaps - is to choose the rate of congestive heart failure hospital admissions, as a proxy of quality of treatments in critical health conditions.

With regard to **health status**, we choose three indirect indicators of health outcomes, namely the share of older population aged over 65, the life expectancy at birth, and the death rate. On the one hand, these indicators may imperfectly represent the general issue of "health outcomes"; on the other hand, they may contribute to signal the general trend of convergence in health systems, given the correlation usually observed between health care resources and health conditions. The choice may be debatable also because the ranking of health systems in terms of performance proposed by the World Health Organization (WHO) in 2000 was criticised on the academic ground (see, for example, Musgrove, 2003) and basically refused at political level by countries with unfavourable rank. Yet, we include these variables in order to capture those cases, if any, in which comparable amounts of resources may give rise to non-comparable health outcomes.

Finally, we consider the dimension of **health insurance**, by including the share of population covered by government compulsory health insurance and the share of population covered by voluntary health insurance, and the dimension of **long-term care** by including the number of beds in residential long-term care facilities.

Of particular interest for the classification of health regimes, our use of the panel data will allow, in principle, that the same country may belong to different clusters over time. In other words, countries are not frozen in any given cluster for all the time period, but they may shift from one cluster to another. In our perspective, this possibility can properly take into account that health regimes, even within a single country, may have been subject to changes. To some extent, this also answers the critique by Wendt (2014) suggesting that the direction of change which goes beyond trends in healthcare expenditure and financing remains unclear.[16]

On the other hand, we may expect that the kind of changes occurred in the last twenty years are sufficiently consolidated to be able to place the countries in a single cluster. A general warning of the analysis, as we will see, is that not all variables will be used at the same time, as the use of certain variables implies gaps either in years or in countries. However, in a first step (next Section) we will focus on those variables that maximise the number of countries observed.

5 Results

5.1 The cluster analysis

The first step of our analysis is based on a hierarchical cluster method based on the set of variables common to all European countries included. As well known,

[16] For an interesting application to public social expenditure trends from 1980 to 2001, see De Simone et al. (2012), where – using a panel data – it is confirmed that the same country may fall in different clusters in different periods.

a crucial question in cluster analysis is how to choose the number of clusters. As there is little theory on how to determine the optimal number of clusters, it may occur that a different number of countries and a different number and quality of variables may lead to different clustering.[17]

We do not have expectations to overcome this problem by using the same type of analysis; however, in this first step, we try to get as much comparability as possible by replicating the cluster analysis according to the number of clusters used in similar studies. To this purpose, table 2 describes how different countries have been grouped by each available study in health sectors.[18]

It can be noted that one study classifies countries in three clusters (Wendt, 2009), one study classifies countries in five clusters (Reibling et al. 2019), and one study in six clusters (Joumard et al., 2010). The remaining three studies (Jensen, 2008; Reibling, 2010; Wendt, 2014) relies on the use of four clusters. Table 3 tries to summarise the information obtained by this survey by highlighting how many times the same countries are grouped together in different studies, after taking into account that the countries considered in each study are not always the same.

Some persistence emerges for some groups: in particular, Austria, Belgium, France, Germany, and Luxembourg (all countries or a subset of them) are often grouped in the same cluster; Finland, Spain, and Portugal are another frequently observed group; also, Denmark and Netherlands; Italy and the United Kingdom; Estonia, Hungary, Poland, and Slovakia, are recurrently grouped together across the studies. It is also worth noting that in Joumard et al. (2010), two clusters are very thin, as one of them includes only Belgium and France, and another one includes only Iceland and Sweden. Furthermore, in Jensen (2008) there is a one-country cluster (with Ireland) in a total of four. Also, in two cases, (Wendt,

[17]This is not, however, a problem specific to cluster methods.

[18]Note that in table 2, the number given to each cluster has only an ordinal meaning; it must not be interpreted as the 'same cluster' across studies.

2009 and Wendt, 2014) some countries are not classified in any cluster (Greece, Netherlands, Norway, Switzerland). As it stands, table 3 leaves some degree of uncertainty on how to classify health models, especially when comparing those classifications with the original models of welfare state proposed by Esping-Andersen (1990) and often replicated in the literature for the analysis of other specific welfare state items.

On the other hand, as said above, there are no clear-cut reasons why the health sector should conform to that clustering. Also, as already shown in Table 2, available studies on health sector use different sets of countries, different variables, and different time spans, and this may be a reason for having different results by itself.

In order to add to the already available results, and to compare our results with the existing ones, we run a hierarchical cluster analysis 'stopping' the number of clusters to cover the number of clusters from 3 to 6 as in the previous studies, regardless of the 'stopping rule' identifying the optimal number of clusters. Table 4 to table 7 report the results. First, it is worth noting that when stopping at three and four clusters (tables 4 and 5), clusters are hardly identifiable. Rather, there is a set of either two or three single clusters where Iceland and Ireland are located, and where Netherlands belongs to only in five years. A feature that reveals more the position of outliers than a consistent 'grouping'.

To some extent, this empirical evidence would be an excellent support to the idea of convergence of health models. Almost the same happens when stopping to 5 clusters; in this case a mixed group of countries (France, Portugal, and Slovenia) detaches from the rest, and the three one-country clusters persist. An outcome that is not enough to outline meaningful models. Some more definition can be traced when stopping to 6 clusters, in which - all else remaining the same

- a separate Eastern European model neatly emerges.

Comparing this latter result with the outcomes of Joumard et al. (2010) - using six clusters - only a few (and not relevant) similarities are found: the first is the presence of Germany, Netherlands, and Switzerland in the same group; the second is the joint presence of Czechia, Estonia, and Slovakia. In the case of six clusters, some sensitivity analysis has also been carried out by either increasing or decreasing the time period; evidence has been found that the group of Eastern European countries, although in variable composition, may still persist. Given their legacy to the previous socialist regime, it is not surprising that they could actually represent a distinct health model within Europe.

It is however necessary to take into account that in all previous cases, the Duda-Hart rule for identifying the optimal number of clusters (through the minimum value of the pseudo T-squared) would stop at two. Thus, the classification used to compare the outcome with the previous studies would not stand up to the test. By replicating the analysis stopping at two clusters, reveals the total absence of differentiation among countries, the second cluster being formed only by Netherlands in five years (not reported in table). Again, following this method, any form of meaningful differentiation between healthcare models would be excluded.

To be more confident in the stability of results obtained by using a weighted average linkage, the same analysis has been replicated using other measures of distance, namely simple, average, complete, median and centroid linkages, with no significant changes.[19]

[19]A single linkage defines the distance between two clusters as the minimum distance between their members, and tends to produce long chain-like clusters. With a complete linkage, the distance between clusters is the maximum distance between their members, leading mostly to compact spherical clusters. With average linkage, the distance between two clusters is calculated as the average distance between all pairs of subjects in the two clusters. Being somewhere between the two previous methods, it is considered to be a fairly robust method. Centroid linkage implies that the centroid (i.e., the mean value for each variable) of each cluster is calculated and the distance between centroids is used. This method is also fairly robust.

Thus, as it stands, it seems that there may be some robust evidence about the convergence of health sectors in European countries, which leaves no room to an interpretable differentiation of models between countries. To some extent, the inability of distinguishing separate 'worlds' of health systems may agree with the long-standing view supporting the superiority of a market-driven social policy, according to which – instead of a variety of welfare regimes marked by home forces and traditions – there exists just one 'right' social policy fully compatible with the market economy (Ferge, 1997). Indeed, since the beginning of the Nineties, in Europe, it was thought that this convergence towards the 'right' social policy was the natural consequence of the absence of countervailing forces of the market at international level, following the spread of globalisation (Swank, 2002). To some extent, Castles (1999) already argued that whereas until the Seventies public healthcare spending was shaped by political variables, since the Eighties cost-containment policies have tended to dominate.

There may be a number of consequences of this unfavourable trend. First, a 'wide' welfare state - to be understood as the extension of social policies to non-poor - runs the risk of going into disrepute as a platform for political parties (but see Goodin and Le Grand, 1987), by this way encouraging more frequent adjustments of welfare benefits only to the poorest part of the population. Second, and also as a consequence, welfare provisions - including health provisions - might be increasingly characterised by minimum - rather than acceptable - standards. Finally, the way towards a minimum role of the State has often been the justification to weaken universality and to pave the way to private insurance schemes. All these features have probably led to a delegitimisation of collective protection against collective risks, privileged individual solutions, and - according to some authors - denied the nature of welfare provisions as social rights (Sunstein, 1993). All these factors might explain why it could

be more difficult to separate now than in the past different 'worlds' of health care.

5.2 A hierarchical analysis with Ward linkage

Since the cluster analysis, among other things, is sensitive to the linkage method, a replication of the analysis is proposed by using a Ward linkage. This method is analytically different from those used in the previous section; the reason why it could be worthwhile to replicate the analysis with it. The Ward linkage requires that the distance from any two clusters is given by how much the sum of squares will increase when the two are merged. In other terms, the Ward linkage reflects the cost of merging, as since in the hierarchical agglomerative method the sum of squares starts out at zero, it will grow when clusters are merged. The aim of the Ward linkage is to take this growth as small as possible. This also implies that given two different pairs of clusters whose centres are equally far apart, Ward linkage will prefer to merge the smaller ones, in the attempt to minimise the total within-cluster inertia (or "error sum of squares") rather than the direct distance somewhat specified. This also implies, in principle, that the Ward method may be less sensitive to noise and outliers, with a tendency to produce compact spherical clusters with similar variance and of similar size (Everitt et al., 2011, especially chapter 4). Thus, what is expected is that clusters will be more dense than found above.

In order to understand the consequences of using a Ward linkage, and to verify whether the previous results were due to an underfitting of the cluster analysis, by which clusters may appear overly generalised, the analysis is replicated again for a potential number of clusters ranging from three to six, which returns an optimal number of clusters of four. However, in all cases, one of the four clusters is again a one-country cluster with Ireland.[20]

[20] Just to remind that this occurs also in Jensen (2008) using four clusters.

Thus, we try to remove Ireland from the analysis while maintaining the upper bound of clusters at four. In removing one country, we rely on the hypothesis of overfitting, which can occur, among other cases, when the number of clusters is too large compared to the intrinsic structure of the data, with clusters containing only few data points. After excluding Ireland, our procedure returns three as the optimal number of clusters. Results are reported in table 8, where three distinct clusters now emerge: cluster 1 is a blurring of countries traditionally belonging to either the Nordic or the Continental models; cluster 3 is a recognisable Eastern European model (with only one transitory exception); while cluster 2 is a less defined mix of countries, merging countries of the Southern European model (Italy, Spain, Greece, Portugal), some countries of the Nordic model (Iceland and Sweden), and the United Kingdom as a member of the traditional liberal model.[21]

There may be some reasons why only Eastern European countries represent a stable cluster. As said above, after 1990 they share a transition from the common legacy of socialism to more Western-type economies. Their health systems, to some extent, may have undergone a hybridization process, which has often meant to undertake a 'shock therapy' by choosing a path of privatisation of some welfare programmes and by partly shifting the responsibility of their provision to social funds and private insurance markets (Kuitto, 2016). Globalisation and economic liberalisation also promoted in these countries by international agencies after 1990, have been influential and have pushed Eastern welfare systems towards a streamlined State characterised by an equally streamlined health sector (Deacon, 2000, 147; Ferge, 2008, 150; Wendt, 2014; Bilbao-Ubillos, 2023).

[21]The results obtained in table 8 are the product of using a squared Euclidean distance. However, using alternative methods (Canberra distance and Minkowski with argument 3) return the same clustering of countries. It is also worth noting that results in table 8 do not change when using the Calinski–Harabasz pseudo-F index as a stopping rule. This sensitivity analysis takes into account that the Calinsk-Harabasz method may work better for smaller number of clusters in the data, while the Duda-Hart would perform better when 4 or more clusters are present (Milligan and Copper, 1985).

This tendency may have induced health systems to maintain some features of the original structure (e.g., a higher level of State regulation, as suggested by Wendt et al., 2013) and to combine them with some conservative-corporatist elements of welfare state typical of Western countries, in which the role of the market and of means-testing procedures prevail (Deacon, 2000; Ferge, 1997). What we instead observe in the other two clusters - conflating Continental, Nordic and Mediterranean models at varying degrees - would support the hypothesis of convergence.

To this purpose, the outcome of Table 8 lays the foundations for understanding, in the future, whether the Eastern European model will chase the health models of the other two clusters, or whether there will be a definitive convergence to the cost-containment, downsizing, and restructuring processes that have involved almost all countries in the last decades.[22]

Of some importance, is that also by replicating the analysis without the Eastern European countries admitted in the European Union in 2004, Nordic and Continental models cannot be split, while a mixed model appears (Greece, Italy, Portugal, Spain and then France and the United Kingdom), and Switzerland becomes a one-country cluster.

5.3 A k-means and a k-median cluster analysis

In order to obtain further support (if any) at the classification obtained with the hierarchical method when the Ward linkage is used, we replicate the analysis by using a k-means cluster analysis, choosing k=3 as the number of clusters. In this

[22] See Ruggles and O'Higgins (1987) for an analysis of the links between welfare retrenchment and the New Right of both Thatcher and Reagan administrations. Our findings, to some extent, would lead to define a unique hybrid welfare system for Eastern Europe, contrary to the recent evidence provided by Filipovic and Dobrotic (2022; 199), arguing that the Visegràd countries and the Baltic countries cannot be considered as a unique hybrid welfare system, given that there are reasons to consider these two groups as specific clusters. See also Castles and Obinger (2008), supporting the emergence of a post-Communist family of nations.

case (first panel of table 9), clustering goes along the previous lines, with more evidence for a Nordic-Continental typology (cluster 1) and an Eastern European model (cluster 3). Cluster 2, instead, would again confirm the convergence of countries traditionally located in other groups. This more interpretable separation, however, is lost when a k-median method is used. In this case, the Eastern European model also vanishes, many countries are included in different clusters in different years, and there is no element that allows a meaningful classification of the models.

5.4 Clustering through a cluster regression analysis

Some further evidence and check for the robustness of the outcome, may be obtained by introducing a cluster regression analysis with the only aim of verifying the persistence of the optimal number of clusters (3). To this purpose, it is worth noting that the optimal number of clusters is obtained by minimising a model information criterion (MIC) given by $MIC = Nln(N)[\frac{RSS}{NT}] + \alpha\theta_N$, where N is the number of countries, RSS is the residual sum of squares, T is the average time series length for unbalanced panels (as in our case), and $\alpha\theta_N$ is a penalty function needed to stop the monotonically decreasing path of RSS in the number of clusters, which would lead to over-parameterise the model by allowing for more clusters than may actually exist.[23]

To this purpose, one standard way of defining the penalty function is to set it as $\alpha\theta_N = \frac{1}{3}ln(N) + \frac{2}{3}\sqrt{N}$, which is found to perform well in Sarafidis and Weber (2015). In our case, we choose another common and unweighted penalty function, simply defined as $\alpha\theta_N = \sqrt{N}$ and regress the public health spending on all other variables we have used for the cluster analysis. By defining the initial partition using a random selection, applying a penalty function $\alpha\theta_N = 5.1$, and

[23] See Christodoulou and Sarafidis (2017).

experimenting with a maximum number of clusters equal to five, the method returns the lowest level of *MIC* for three clusters. This optimal number is more conforming with the outcome of our cluster analysis with the Ward linkage. However, once again, countries are classified without a clear correspondence with the traditional models. In all clusters, indeed, there is a mix of countries traditionally belonging to specific welfare state models.

In particular, the usual distinction between liberal, continental, and Nordic welfare states does not apply; a Southern European model does not appear; and the definition of a Eastern European model also disappears. To some extent, as already observed by Losada and Ares (2021), this may be explained by the changes occurred in some basic elements of each regime, with some convergence in the way in which health care provisions are delivered, as well as in both the public-private and the universal-selective dualism. Moreover, health reforms, while often led by country-specific factors, are in part characterised by a diffusion process, which means that policy changes in one country may be influenced by policy changes in other countries. As also argued by Panic (2003; 74), this may happen because both the stability and the long-term progress of any country often depend also by the actions of governments in countries it has close ties with.[24]. A process that might prove truer in the integrated European economic system, where different countries face the same economic constraints, but where a 'European social space' is having difficulty manifesting itself (Alsasua et al., 2007; 297).

5.5 Some other robustness analysis

The previous results are based on the use of those variables that maximises the number of countries and observations in our unbalanced panel data. Further elaboration has been carried out by progressively inserting variables whose use

[24]See Gilardi et al., 2009 for the case of hospital financing reforms

implies the loss of one or more countries. Results are not reported in additional tables, but are briefly discussed. The main finding of including *long-term beds* (losing Portugal), *long-term beds*, *congestive*, *beds*, and *out-pocket* (losing Portugal, Greece, Latvia, Germany, Iceland, Denmark), and finally adding *vol-ins* (additionally losing Italy, Luxembourg, Norway, and Sweden) confirm the outcome described in table 8, with only marginal changes.

As a final step, we try to summarise the multiple dimensions of the health sector by constructing a summary index using a generalised least-squares (GLS) weighting procedure. This procedure, according to Schwab et al. (2020), increases efficiency by ensuring highly correlated indicators receive less weight than uncorrelated indicators. Intuitively, uncorrelated indicators, which represent "new" information, receive more weight. In particular, the weights are calculated as the inverse of the covariance matrix of the normalised variables. The normalised variable is then used to replicate the cluster analysis with the Ward linkage. Thus, instead of using all dimensions of the health sector, we now investigate whether a cluster analysis only based on the normalised index can return the same grouping as before. Results are reported in table 11, where all countries are classified in at least two clusters for different periods, which means that a classification of health sectors along the traditional lines may be hard. Rather, this method returns a fuzzy clustering. We will be back on this specific issue later; in the next section, we try to evaluate the main characteristics of the (possible) clusters that have emerged so far.

5.6 Characteristics of the clusters

The analysis conducted so far shows that, if any, a reliable partition of countries is in three clusters. In many other cases, a meaningful clustering is not achieved.

In order to provide a comment on the specific characteristics of the best outcome, we make reference to the results obtained in table 8 (with Ward linkage), where a quasi-Nordic-Continental model is recognisable in cluster 1, an Eastern European model is confirmed in cluster 3, and a mixed group of countries belongs to cluster 2.

Tables 12, 13, and 14 report, for each cluster, the time-series of the mean values of the variables introduced in our analysis. A general warning in commenting these figures is to remind that years 2020 and 2021 may have been deeply affected by the pandemic crisis. To build a meaningful comment of the clusters' characteristics, it is worth starting from the more persistent outcome, i.e. the Eastern European model, and to understand the empirical evidence explaining why it is a distinct clusters. Compared to the other two clusters, this group of countries shows specific indicators of diversity.

First, there is evidence of a lower level of public health spending, with an upward trend observable only during the pandemic years. This lower level of health spending is then associated to both a higher death rate and a lower life expectancy at birth. Second, to some extent, a historical lower level of total health employment may concur to generate a less than adequate level of public health spending. Given that both the share of private health spending and the share of public pharmaceutical expenditures are also lower, this group of countries may be clearly characterised by a total health spending below the average of other European countries, which contributes to separate their status as neatly as we have observed in the cluster analysis. Furthermore, as additional factors of distance from the other two clusters, one can observe a slightly lower level of government compulsory health insurance, a lower number of weeks during which sickness benefits are payable, and a longer average stay in hospital, also compared to the OECD average of 7.6 days, which - according to the stan-

dard interpretation - may be considered as an indicator of a lower efficiency in managing the number of beds. To some extent, compared with the other two clusters, there is also a greater difficulty in reducing the number of discharges (with the exception of 2020 and 2021), which has no a clear-cut interpretation. On the one hand, an improvement of discharge of patients can help freeing up hospitals beds and health worker time. On the other hand, premature discharges may worsen health outcomes and lead to new costly admissions. Whatever the nature of discharges, before the pandemic crisis (in 2019), the average number of discharges in cluster 3 was about 185 per 1.000 inhabitants, in comparison to an OECD average of about 146.

With regard to the more traditional clusters 1 and 2, some differences can be observed. To this purpose, it is worth focusing on cluster 2, which is a mixed cluster, to investigate the empirical difference with the more compact Nordic-Continental model. In cluster 2, we combine an almost stable if not slightly decreasing public health spending (until 2019) with a mild increasing trend of private health spending, and a more marked decreasing trend in the share of public pharmaceutical expenditures. Overall, these three elements can provide some evidence of a general trend of retrenchment in health spending, an issue that, at least in some countries, fits with the hypothesis that public health might converge towards relatively lower standards. Note also that even during the pandemic, the average increase in health spending has been lower than that realised by countries in cluster 1. This difference with cluster 1 is amplified when one considers a lower recourse to in-kind non means-tested benefit, a lower level of discharges (the indirect indicator of efficiency), a lower gross replacement rate of sickness benefits, a significant higher number of weeks to obtain the payment, a historically higher duration of payable sickness benefits, and a slightly lower coverage as a proportion of the labour force.

Figures 1 to 5 also show the evolution of some fundamental indicators of healthcare in the three clusters. A growing trend of public spending in all clusters (figure 1) - at a slower pace in cluster 3 - is associated to a rapid growth of private health expenditures (figure 2) in cluster 2 (the mixed group of countries) and to a generalised decrease of the share of public pharmaceutical expenditures on total health spending in all clusters (figure 3). It is worth noting that in cluster 2 both the increase of private spending and the reduction of public pharmaceutical expenditures are particularly pronounced. Figures 4 and 5, then, complete the information by signalling two other characteristics that may support the idea of convergence: in figure 4, it can be observed that the number of beds in public owned hospitals (measured as days per person) decreases in all clusters, while in figure 5 it is particularly evident for clusters 2 and 3 the increase of the households out-of-pocket payments.

It is of some importance to observe, at this stage, that the clustering obtained in table 8 for the health sector has some interesting points of contact with the classification proposed elsewhere of the varieties of capitalism (Hall and Soskice, 2001). In particular, comparing with Witt et al. (2018), clustering varieties of business systems, our cluster 1 perfectly overlaps with the cluster of "coordinated market economies" (with the exception of Luxembourg that is not included in the analysis of Witt et al.). At the same time, part of our cluster 2 (France, Greece, Italy, Portugal, and Spain) overlaps with the cluster of "European peripheral economies; and also overlaps with the cluster differently named as "coordinated market economies" in Movahed (2023), while our cluster 1 fits well with the cluster called "social democratic market economies".

Thus, apart from the naming of the cluster, it seems that health models investigated in our study correlate with specific characteristics of both business systems and varieties of capitalism, an element to keep in mind for further

advances in the understanding of both health and welfare systems.

5.7 A model-based clustering

In order to give further evidence about the uncertain classification of clusters, in this last section we move to a *model-based* clustering method (Banfield and Raftery, 1993; Everitt et al. 2011). This method postulates a formal statistical model for the population from which data are sampled, with the aim of estimating a posterior probability of cluster membership. In our case, given the mixed results obtained, the availability of a posterior probability of belonging to a specific cluster may potentially help either to distinguish healthcare models more neatly or to confirm the hypothesis of convergence.

Estimating a model-based clustering returns a probability of each country to belong to a given cluster. In our case, as a further signal that health systems are to some extent converging, almost all countries have a probability of belonging to any cluster. Figure 15 - for each country - is built after selecting the highest probabilities of cluster membership. It is evident that no country can be attributed to any cluster with certainty. As it stands, figure 15 provides further support that separate healthcare models in Europe are hardly found.

6 Concluding remarks

The main finding of our analysis can be summarised by saying that healthcare systems in Europe hardly conforms to the traditional classification of welfare states; and that, in some cases, it does not comply at all with it. Even though there might be evidence that the public sector has only partially retrenched from health sectors, the data shows that the corridor that European health systems must pass through has narrowed, leading to various forms of convergence of

health indicators. This convergence collide with old – yet well established – opinions focusing on institutional legacies as the main factor able to preserve differences in health systems across countries;[25] at the same time it fits into the trail of those studies arguing that modern welfare states are "a patchwork mixes of old and new policies and institutions" (Hemerijck, 2012; 12).

We can add that this patchwork is not a guarantee for a universal access to health care. As recently argued by Sowula et al. (2023; 11), for example, Germany and Sweden may be no longer appropriate benchmarks, respectively, for the conservative and the social democratic regimes. In the same vein, a recent study by Tine et al. (2022; 204) shows that the unequal distribution of long-term care services in Denmark is mainly due to lack of resources and not to any particular political orientation, with clear signs of overall retrenchment. Also, Szebehely and Meagher (2018; 304) have found that de-universalization has occurred to different degrees in all Nordic countries, with an increase in for-profit provision of publicly funded care services, an increase of family care and of the amount of services paid out-of-pocket, all an explicit attack on universalism or downsizing of formal rights.

As also documented by Ranci and Pavolini (2015; 282) for the case of long-term care in Europe, after the financial crisis universal access has been reduced and often reversed towards a more pronounced role of the private sector in care provision, giving rise to a form of 'restricted universalism', by which all people in need are explicitly entitled to access the same LTC services, but with a range of restrictions in the provision, quality or access to services. Often, this happens largely irrespective of partisan orientation, as "governments have systematically responded to the crisis and its consequences on public finances, deficits and debts by imposing social protection cuts and containment measures" Barbier (2012;

[25] See, for example, Pierson (2004; 17); Hacker (1998) for the case of path-dependent US health system; Taylor-Gooby (1996); Wilsford (1994), focusing on the path-dependency of health systems and the observation of occasional big changes.

391).[26]

Overall, we believe that the convergence of health indicators and the threaten to universalism that can derive from it can be interpreted as a reduction of the ability of European countries to find independent adjustments to the question of how to organise health care (see also Rothgang, 2010; 247). This weakness should not be expected to give rise to a satisfactory equilibrium in healthcare systems. Rather, a progressive reduction of public resources allocated to healthcare is likely to clash with increasing health needs that are likely to manifest themselves within European countries in the coming years.

Therefore, our findings are important insofar as they highlight how economic integration of European countries strongly conditioned by budgetary constraints can undermine the effectiveness of universal access to healthcare, causing a downward slide towards a minimum level of health protection on the grounds that 'social' will become not sustainable in strict economic terms. As also similarly argued in less recent times by Ploug (1995), the debate is whether European countries will be able to maintain health at acceptable levels while at the same time providing universal access, or whether there will be the need for further changes. In this latter case, the issue should not be how to expand the role of the private sector, but how to maintain and strengthen the action of the public sector in healthcare.

[26] In this vein, and for a different outcome more conforming to the traditional classification in the field of education, see West and Nikolai (2013), which is however based on one-year observations in the period 2009-2011.

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Table 1: Variables and source of data

OECD categories	Variables	Source	Name of the variable
Health expenditures	a) Health spending (1)	OECD HS	health
	b) Cash benefits non means-tested	ESSPROS	V1A
	c) In kind benefits non means-tested	ESSPROS	V2A
	d) Cash benefits means-tested	ESSPROS	V3A
	e) In kind benefits means-tested	ESSPROS	V4A
	f) Households out-of-pocket payments (1)	OECD HS	outpocket
	g) Private sector expenditures (1)	WHO	H568
	h) Public pharmaceutical expenditures (2)	WHO	580
Health status	a) Life expectancy at birth	OECD HS	lifexpbirth
	b) Death rate x 1.000 inhabitants	OECD HS	deathrate
	c) Proportion of +65 over total population	OECD HS	oldpop
Health quality	Congestive heart failure hospital admissions	OECD HS	congestive
Health care utilisation	a) Inpatient discharges x 100.000 inhabitants	OECD HS	disch
	b) Average length of stay, all hospitals	WHO	H540
Health insurance	Government compulsory health insurance (3)	OECD HS	govins
Long-term care	Beds in residential long-term care facilities (4)	OECD HS	longtermbeds
Health protection	a) Sickness, gross 26-week replacement rate (5)	Social Insurance Entitlement Dataset	srtsw26s
	b) Amount of weeks during which sickness benefit is payable	SIED	sduratio
	c) Number of "waiting days" of sickness before payment	SIED	swaiting
	d) Coverage ratio as proportion of labour force	SIED	scovratl

(a) Note:
(1) Percentage of GDP; (2) Percentage of total health spending; (3) Percentage of the population; (4) Per 1,000 population aged 65+. OECD HS= OECD Health Statistics; ESSPROS = European System of integrated Social PROtection Statistics; WHO = World Health Organization; SIED = Social Insurance Entitlement Dataset.

Table 2: Comparison of cluster results in health sector

Countries	Jensen (2008)	Wendt (2009)	Reibling (2010)	Joumard et al. (2010)	Wendt (2014)	Reibling et al. (2019)
Austria	3	1	1	3	4	1
Belgium	3	1	1	2	4	1
Czechia			2	3	1	1
Denmark	2	2	3	5	1	3
Estonia					1	4
Finland	2	3	4	5	2	2
France	3	1	1	2	4	1
Germany	3	1	2	1	4	1
Greece		Any cluster	2	3	3	
Hungary				6	1	4
Iceland				4	2	1
Ireland	4	2		6	1	1
Italy	3	2	4	6	1	3
Luxembourg		1		3	4	1
Netherlands	2	Any cluster	3	1	1	3
Norway	1			6	Any cluster	2
Poland			3	6	1	4
Portugal		3	4	5	2	2
Slovakia				1	1	4
Slovenia					1	
Spain	1	3	3	5	2	3
Sweden	2	2	1	4	2	2
Switzerland			1	1	Any cluster	5
United Kingdom	2	2	3	6	1	3
Total number of clusters	4	3	4	6	4	5
Time period	2001	2001	2003	n.a.	2001 and 2007	Average 2011-2014

(a) The number assigned to each cluster does not identify the same cluster across different studies; it corresponds to the way in which the authors have classified countries. A blank space indicates that the country has not been included in the analysis. "Any cluster" indicates that the country has not been assigned to any of the clusted considered.

Table 3: Clusters of countries in health sector

Clusters	Jensen (2008)	Wendt (2009)	Reibling (2010)	Joumard et al. (2010)	Wendt (2014)	Reibling et al. (2019)
A	Spain Norway	Spain Finland Portugal	Italy Portugal Finland	Hungary Ireland Italy United Kingdom Norway Poland	Iceland Finland Spain Portugal Sweden	Finland Portugal Sweden Norway
B	Denmark Netherlands Finland Sweden	Denmark Ireland Italy UK	Denmark Netherlands Spain Poland	Denmark Spain Finland Portugal	Denmark Czechia Estonia Hungary Poland Slovakia Ireland Italy United Kingdom Netherlands Slovenia	Denmark Netherlands Spain United Kingdom Italy
C	Austria Belgium France Germany Italy	Austria Belgium France Germany Luxembourg	Austria Belgium France Sweden Switzerland	Belgium France	Austria Belgium France Germany Luxembourg	Austria Belgium France Germany Luxembourg Czechia Iceland Ireland
D	Ireland		Czechia Germany Greece	Germany Netherlands Slovakia Switzerland	Greece	Estonia Hungary Poland Slovakia
E				Austria Czechia Greece Luxembourg		
F				Iceland Sweden		
NC		Greece Netherlands			Norway Switzerland	

(a) NC = Not assigned to any cluster

Table 4: Cluster composition stopping at 3

Cluster 1	Cluster 2	Cluster 3
Austria	Iceland	Netherlands (5)
Belgium		
Czechia		
Denmark		
Estonia		
France		
Finland		
Germany		
Greece		
Hungary		
Ireland		
Italy		
Latvia		
Lithuania		
Luxembourg		
Netherlands (16)		
Norway		
Poland		
Portugal		
Slovakia		
Slovenia		
Spain		
Sweden		
Switzerland		
United Kingdom		

(a) Note: Weighted average linkage - Optimal number of clusters 2/3 with Duda-Hart rule - Squared Euclidean distance.

Table 5: Cluster composition stopping at 4

Cluster 1	Cluster 2	Cluster 3	Cluster 4
Austria	Ireland	Iceland	Netherlands (5)
Belgium			
Czechia			
Denmark			
Estonia			
France			
Finland			
Germany			
Greece			
Hungary			
Italy			
Latvia			
Lithuania			
Luxembourg			
Netherlands (16)			
Norway			
Poland			
Portugal			
Slovakia			
Slovenia			
Spain			
Sweden			
Switzerland			
United Kingdom			

(a) Note: Weighted average linkage - Optimal number of clusters 2/4 with Duda-Hart rule - Squared Euclidean distance.

Table 6: Cluster composition stopping at 5

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Austria	France	Ireland	Iceland	Netherlands (5)
Belgium	Portugal			
Czechia	Slovenia			
Denmark				
Estonia				
Finland				
Germany				
Greece				
Hungary				
Italy				
Latvia				
Lithuania				
Luxembourg				
Netherlands (16)				
Norway				
Poland				
Slovakia				
Spain				
Sweden				
Switzerland				
United Kingdom				

(a) Note: Weighted average linkage - Optimal number of clusters 2/5 with Duda-Hart rule - Squared Euclidean distance.

Table 7: Cluster composition stopping at 6

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Austria	Czechia	France	Ireland	Iceland	Netherlands (5)
Belgium	Estonia	Portugal			
Denmark	Poland	Slovenia			
Finland	Hungary				
Germany	Latvia				
Greece	Lithuania				
Italy	Slovakia				
Luxembourg					
Netherlands (16)					
Norway					
Spain					
Sweden (13)					
Switzerland					
United Kingdom					

(a) Note: Weighted average linkage - Optimal number of clusters 2/6 with Duda-Hart rule - Squared Euclidean distance.

Table 8: Cluster composition - Ward linkage

Cluster 1	Cluster 2	Cluster 3
Austria	France	Czechia
Belgium	Greece	Estonia
Denmark	Italy	Hungary
Finland	Portugal	Latvia
Germany	Slovenia	Lithuania
Luxembourg	Spain	Poland
Netherlands (16)	Sweden (6)	Slovakia
Norway	United Kingdom	Netherlands (5)
Sweden (15)	Iceland	
Switzerland		

(a) Note: Optimal number of clusters 3 with Duda-Hart rule; Squared Euclidean distance.

Table 9: Cluster composition with k-means and k-median

Cluster 1	Cluster 2	Cluster 3
	k-means	
Austria	France	Czechia
Belgium (19)	Greece	Estonia
Denmark	Iceland	Hungary
Finland	Ireland (18)	Latvia
Germany (3)	Italy	Lithuania
Luxembourg	Portugal	Poland
Netherlands (20)	Slovenia	Slovakia
Norway	Spain	
Sweden	United Kingdom	
Switzerland		
	k-median	
Belgium (6)	Austria (7)	Austria (14)
Estonia (1)	Belgium (2)	Belgium (13)
France	Czechia	Denmark
Greece	Estonia (14)	Finland (18)
Iceland	Finland (3)	Germany (13)
Ireland	Germany (8)	Luxembourg
Italy	Hungary	Netherlands (16)
Portugal	Latvia	Norway (14)
Slovenia (20)	Lithuania	Sweden
Spain	Netherlands (5)	Switzerland
United Kingdom	Poland	
	Slovakia	
	Slovenia (1)	

(a) Note: k-means and k-median clustering with k=3

Table 10: Cluster composition with cluster regression

Cluster 1	Cluster 2	Cluster 3
Denmark	Austria	Belgium
Greece	Czechia	Finland
Ireland	Estonia	Hungary
Iceland	France	Latvia
Luxembourg	Germany	Lithuania
Portugal	Italy	Poland
Sweden	Netherlands	Slovakia
	Norway	Switzerland
	Slovenia	
	Spain	
	United Kingdom	

(a) Note: Optimal number of clusters 3 - Penalty function $\sqrt{N}$.

Table 11: Cluster composition with a weighted index

Cluster 1	Cluster 2	Cluster 3
Austria (19)	Denmark (7)	Austria (2)
Belgium (8)	France (8)	Belgium (13)
Czechia (13)	Greece (1)	Czechia (8)
Denmark (3)	Hungary (1)	Denmark (11)
Estonia (11)	Iceland	Estonia (4)
Finland (9)	Latvia (1)	Finland (12)
France (12)	Lithuania (12)	France (1)
Germany (7)	Norway (5)	Germany (14)
Greece (8)	Portugal (7)	Greece (12)
Hungary (18)	Slovakia (8)	Hungary (2)
Ireland (4)		Ireland (17)
Italy (19)		Italy (2)
Latvia (10)		Latvia (10)
Lithuania (9)		Luxembourg (2)
Luxembourg (1)		Netherlands (16)
Netherlands (5)		Norway (7)
Norway (2)		Poland (12)
Poland (9)		Portugal (4)
Portugal (10)		Slovakia (5)
Slovakia (8)		Slovenia (7)
Slovenia (14)		Spain (8)
Spain (13)		Sweden (13)
Sweden (8)		United Kingdom (10)
Switzerland		
United Kingdom (11)		

(a) Note: Optimal number of clusters 3 - Squared Euclidean distance - Weighted average linkage.

Table 12: Average values, Cluster 1

	Cluster 1																
	Health	Old_pop	Death_rate	Life_exp_birth	V1A	V1B	V1C	V1D	tot_emp	disch	gov_ins	srtsw26s	swaiting	sduratio	scovratl	H568	H580	H540
2001	8.7	15.7	9.7	78.4	17.8	81.4	0.0	0.82	56.6	19610	98.1	0.591	0.167	53.5	0.9	2.46	59.1	10.0
2002	9.0	15.8	9.8	78.6	17.6	81.6	0.0	0.81	57.5	19464	97.7	0.595	0.167	53.5	0.9	2.53	61.1	9.9
2003	9.3	15.9	9.8	78.7	16.8	82.4	0.0	0.81	58.3	19427	97.8	0.600	0.167	53.5	0.9	2.62	61.6	9.7
2004	9.4	16.1	9.4	79.2	16.3	82.9	0.0	0.83	58.9	19544	97.8	0.604	0.167	53.5	0.9	2.61	62.0	9.5
2005	9.4	16.4	9.4	79.4	15.7	83.5	0.0	0.78	59.8	19473	97.8	0.608	0.167	53.5	0.9	2.58	62.4	9.3
2006	9.3	16.3	9.2	79.7	16.6	82.7	0.0	0.66	62.7	18266	98.0	0.622	0.143	60.7	0.9	2.36	65.8	9.4
2007	9.1	16.7	9.3	80.0	17.0	82.2	0.0	0.75	65.7	18100	98.3	0.645	0.250	94.7	0.9	2.28	65.2	9.0
2008	9.2	16.6	9.2	80.3	17.7	81.7	0.0	0.57	71.0	18331	98.5	0.684	0.222	79.6	0.9	2.10	63.8	8.7
2009	10.0	16.8	9.2	80.4	17.6	81.8	0.0	0.56	72.1	18534	99.7	0.684	0.222	69.2	0.9	2.25	63.7	8.5
2010	9.5	16.7	9.0	80.6	17.5	82.0	0.0	0.54	72.0	18336	99.8	0.715	0.200	58.1	0.9	2.12	65.6	8.3
2011	10.0	17.3	9.1	80.9	17.5	81.9	0.0	0.54	74.0	18543	99.8	0.680	0.244	60.2	0.9	2.24	63.0	8.0
2012	10.2	17.6	9.3	81.0	17.3	82.1	0.0	0.55	74.6	18458	99.8	0.678	0.267	61.5	0.9	2.25	62.2	7.8
2013	10.3	17.9	9.2	81.2	17.1	82.4	0.0	0.54	75.1	18294	99.8	0.675	0.289	62.9	0.9	2.26	60.9	7.7
2014	10.4	18.2	9.0	81.6	16.7	82.7	0.0	0.55	75.2	18302	99.8	0.672	0.311	64.3	0.9	2.24	60.6	7.6
2015	9.9	18.1	9.1	81.5	17.4	82.1	0.0	0.53	75.7	17536	99.9	0.702	0.300	64.3	0.9	2.11	61.9	7.5
2016	10.5	18.7	9.1	81.7	16.8	82.6	0.0	0.57	76.9	17744	99.9	0.669	0.333	65.8	0.9	2.21	59.8	7.3
2017	10.4	19.0	9.2	81.9	16.8	82.7	0.0	0.56	77.5	17524	99.8	0.669	0.333	65.8	0.9	2.19	59.3	7.1
2018	10.4	19.2	9.3	82.0	16.7	82.8	0.0	0.54	78.5	17472	99.8	0.670	0.333	65.9	0.9	2.18	58.9	7.0
2019	10.5	19.4	9.1	82.3	16.8	82.6	0.0	0.54	79.4	17345	99.8	0.670	0.333	66.0	0.9	2.16	58.1	6.9
2020	10.7	19.2	9.5	81.9	17.9	81.7	0.0	0.47	79.9	15188	99.8	0.703	0.300	67.3	0.9	2.02	59.6	6.9
2021	11.3	19.9	9.7	82.2	16.7	82.9	0.0	0.47	83.3	15908	99.8	0.670	0.333	66.2	0.9	2.13	57.6	6.6

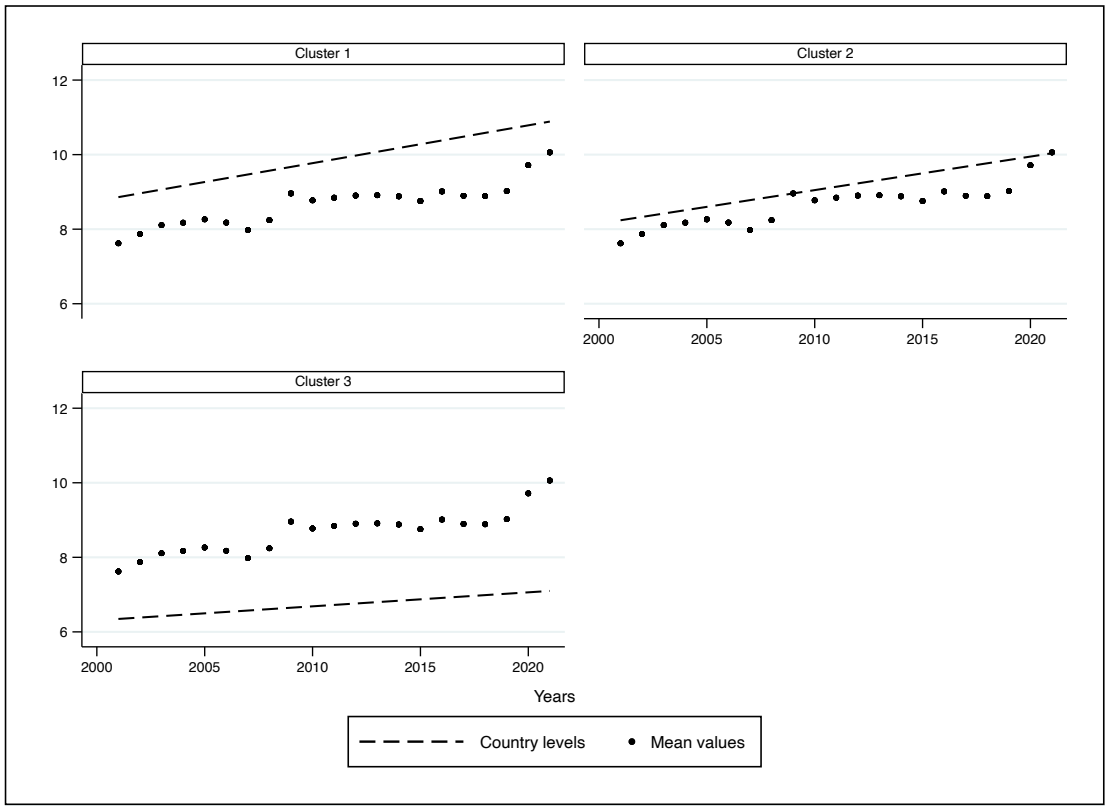
Table 13: Average values, Cluster 2

	Cluster 2																
	Health	Old_pop	Death_rate	Life_exp_birth	V1A	V1B	V1C	V1D	tot_emp	disch	gov_ins	srtsw26s	swaiting	sduratio	scovratl	H568	H580	H540
2001	8.0	16.6	9.59	78.7	8.2	54.2	0.088	0.004	36.8	15453	99.60	0.484	2.38	123.8	0.845	2.25	65.5	8.8
2002	8.2	16.7	9.66	78.8	8.2	54.2	0.078	0.004	37.5	15374	99.64	0.484	2.38	123.8	0.848	2.28	65.8	8.6
2003	8.4	16.8	9.85	78.9	7.9	54.5	0.086	0.004	37.9	15118	99.80	0.484	2.38	123.8	0.851	2.35	65.4	8.6
2004	8.5	16.9	9.35	79.5	7.5	54.9	0.068	0.020	38.8	15206	99.75	0.484	2.38	123.8	0.854	2.30	65.9	8.5
2005	8.7	16.5	9.14	79.8	8.6	58.0	0.046	0.020	41.7	15474	99.70	0.488	3.67	115.8	0.869	2.29	63.6	8.0
2006	8.6	17.2	9.25	80.1	6.8	55.6	0.006	0.040	39.7	15311	99.65	0.503	2.38	112.1	0.855	2.35	66.2	8.2
2007	8.6	17.3	9.27	80.1	5.0	52.1	0.034	0.025	34.3	15225	99.62	0.483	2.57	67.1	0.832	2.46	67.0	8.2
2008	9.0	17.4	9.27	80.3	4.7	52.4	0.036	0.021	34.8	15310	99.78	0.507	2.57	67.1	0.831	2.52	66.7	8.1
2009	9.6	17.6	9.24	80.6	4.3	52.7	0.095	0.044	35.3	15252	99.80	0.530	2.57	67.1	0.829	2.48	66.8	8.0
2010	9.4	17.1	8.85	81.0	6.2	56.1	0.122	0.044	39.5	14864	99.82	0.548	4.00	65.3	0.839	2.37	63.5	7.7
2011	9.5	18.0	9.17	81.2	4.7	52.2	0.183	0.052	36.5	14861	99.84	0.553	2.57	80.5	0.826	2.52	63.8	8.0
2012	9.5	18.3	9.53	81.2	4.4	52.4	0.310	0.058	36.6	14700	99.85	0.552	2.57	93.9	0.825	2.58	62.6	8.1
2013	9.4	18.7	9.40	81.5	4.2	52.4	0.442	0.050	36.9	14003	99.85	0.552	2.57	107.3	0.825	2.57	59.2	8.0
2014	9.3	19.1	9.31	81.8	4.3	52.4	0.395	0.066	37.4	13917	99.86	0.552	2.57	120.6	0.824	2.57	57.1	8.0
2015	9.2	18.7	9.48	81.7	6.0	56.2	0.288	0.055	40.9	13557	99.83	0.545	4.00	123.8	0.839	2.46	53.8	7.8
2016	9.3	19.8	9.73	81.9	4.6	52.2	0.290	0.059	38.5	13782	99.85	0.549	2.49	134.0	0.824	2.58	55.3	8.0
2017	9.2	20.1	10.04	81.8	4.5	52.3	0.278	0.065	39.1	13634	99.84	0.546	2.40	134.0	0.825	2.59	53.6	8.0
2018	9.2	20.4	10.00	82.0	4.5	52.3	0.265	0.060	39.6	13502	99.99	0.543	2.31	134.0	0.825	2.59	52.4	8.0
2019	9.3	20.7	10.00	82.3	4.7	52.1	0.251	0.034	40.2	13338	99.99	0.540	2.23	134.0	0.826	2.60	51.4	8.0
2020	10.5	20.2	10.60	81.5	6.2	56.0	0.209	0.025	44.4	11310	99.94	0.533	3.63	123.8	0.841	2.48	47.7	8.0
2021	10.7	21.3	11.07	81.6	4.8	52.1	0.225	0.028	42.0	11991	99.99	0.534	2.14	134.0	0.828	2.61	49.3	8.1

Table 14: Average values, Cluster 3

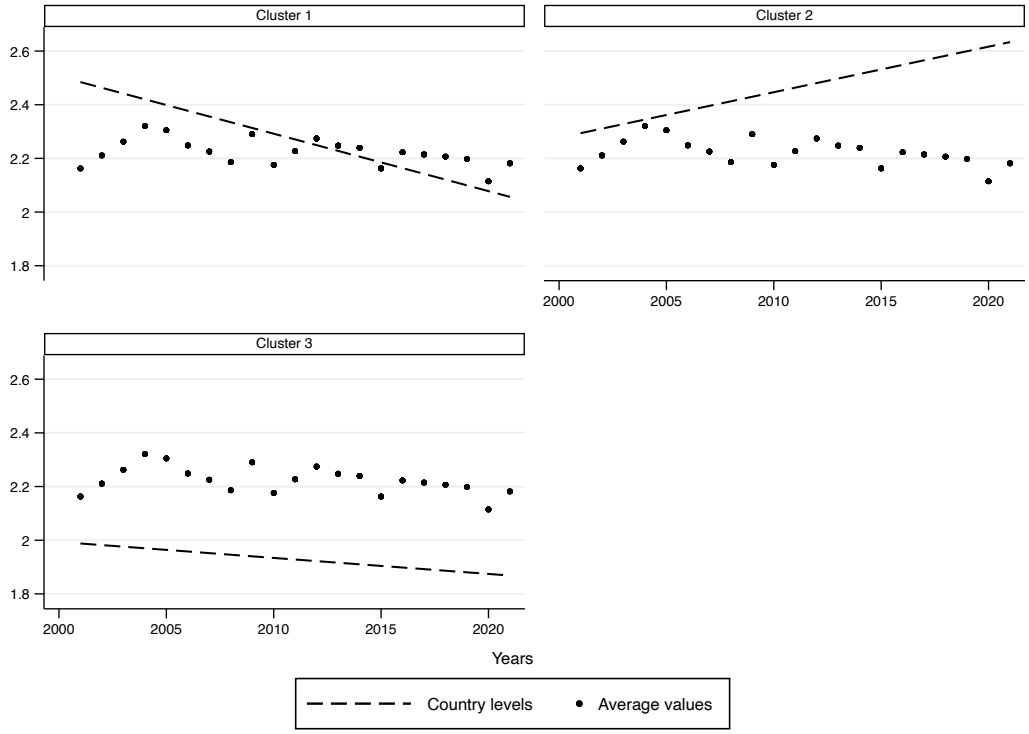
	Cluster 3																	
	Health	Old_pop	Death_rate	Life_exp_birth	V1A	V1B	V1C	V1D	tot_emp	disch	gov_ins	srtsw26s	swaiting	sduratio	scovratl	H568	H580	H540
2001	6.2	13.7	11.0	73.7	16.8	82.7	0.20	0.37	30.3	19070	91.1	0.70	0.14	47.5	0.82	1.82	53.8	10.4
2002	6.5	13.8	11.1	73.8	16.5	82.9	0.21	0.34	30.7	19198	91.2	0.69	0.14	48.3	0.82	1.86	54.8	10.1
2003	6.7	14.0	11.2	74.0	16.2	83.3	0.18	0.29	31.9	19380	91.5	0.69	0.14	49.1	0.81	1.85	55.1	9.9
2004	6.8	14.2	11.1	74.3	15.4	84.2	0.17	0.26	31.4	19642	91.6	0.68	0.14	49.9	0.81	2.09	53.0	9.7
2005	6.8	14.4	11.4	74.3	15.2	84.3	0.19	0.26	31.6	19389	92.2	0.68	0.14	50.7	0.81	2.09	53.2	9.6
2006	6.4	14.8	11.9	73.7	13.0	86.4	0.26	0.29	25.3	20886	97.4	0.66	0.17	41.0	0.80	1.98	52.3	9.1
2007	6.1	15.3	12.2	73.8	14.2	85.4	0.23	0.25	25.3	20246	97.0	0.67	0.40	38.2	0.81	1.93	47.9	8.8
2008	6.4	15.5	11.9	74.3	14.4	85.1	0.24	0.22	25.3	20210	96.6	0.66	0.46	37.5	0.81	1.95	49.1	8.8
2009	7.0	15.7	11.8	74.8	14.9	84.6	0.25	0.24	25.4	19804	96.6	0.65	0.51	36.8	0.80	2.15	50.1	8.5
2010	7.0	15.9	11.8	75.1	11.7	87.2	0.24	0.83	25.3	19170	96.4	0.64	0.57	36.1	0.80	2.04	49.6	8.5
2011	6.7	16.1	11.7	75.6	11.3	87.5	0.25	0.93	25.8	19335	96.2	0.64	0.66	36.1	0.81	1.91	49.4	8.4
2012	6.7	16.4	11.8	75.8	11.3	88.0	0.27	0.39	26.1	19304	95.4	0.64	0.74	36.1	0.82	2.00	48.8	8.3
2013	6.6	16.7	11.8	76.1	11.8	87.8	0.28	0.19	26.5	19267	95.4	0.64	0.83	36.1	0.83	1.92	48.2	8.1
2014	6.6	17.0	11.7	76.5	11.5	88.0	0.29	0.16	27.1	19336	95.2	0.64	0.91	36.1	0.85	1.91	48.0	8.1
2015	6.6	17.5	12.1	76.5	12.8	86.7	0.33	0.15	27.7	19306	95.2	0.64	1.00	36.1	0.86	1.89	47.6	8.2
2016	6.8	17.8	11.9	76.8	13.4	86.2	0.32	0.12	28.4	19374	95.4	0.64	0.91	36.1	0.86	1.88	47.9	8.2
2017	6.6	18.3	12.2	76.9	14.2	85.4	0.32	0.15	28.8	19058	95.6	0.64	0.83	36.1	0.86	1.87	48.1	8.2
2018	6.6	18.6	12.3	77.0	14.2	85.4	0.29	0.13	29.4	18835	96.3	0.64	0.74	36.1	0.87	1.86	48.3	8.2
2019	6.8	18.9	12.0	77.4	14.0	85.4	0.38	0.12	29.9	18553	96.5	0.64	0.66	36.1	0.87	1.84	49.2	8.3
2020	7.5	19.3	13.2	76.7	15.5	84.0	0.34	0.09	30.3	14840	96.6	0.64	0.57	36.1	0.87	1.83	49.9	8.3
2021	7.9	19.7	15.2	75.4	14.3	85.2	0.34	0.08	31.0	14614	97.0	0.64	0.57	36.1	0.88	1.82	50.6	8.3

Figure 1: Health spending, percentage of GDP



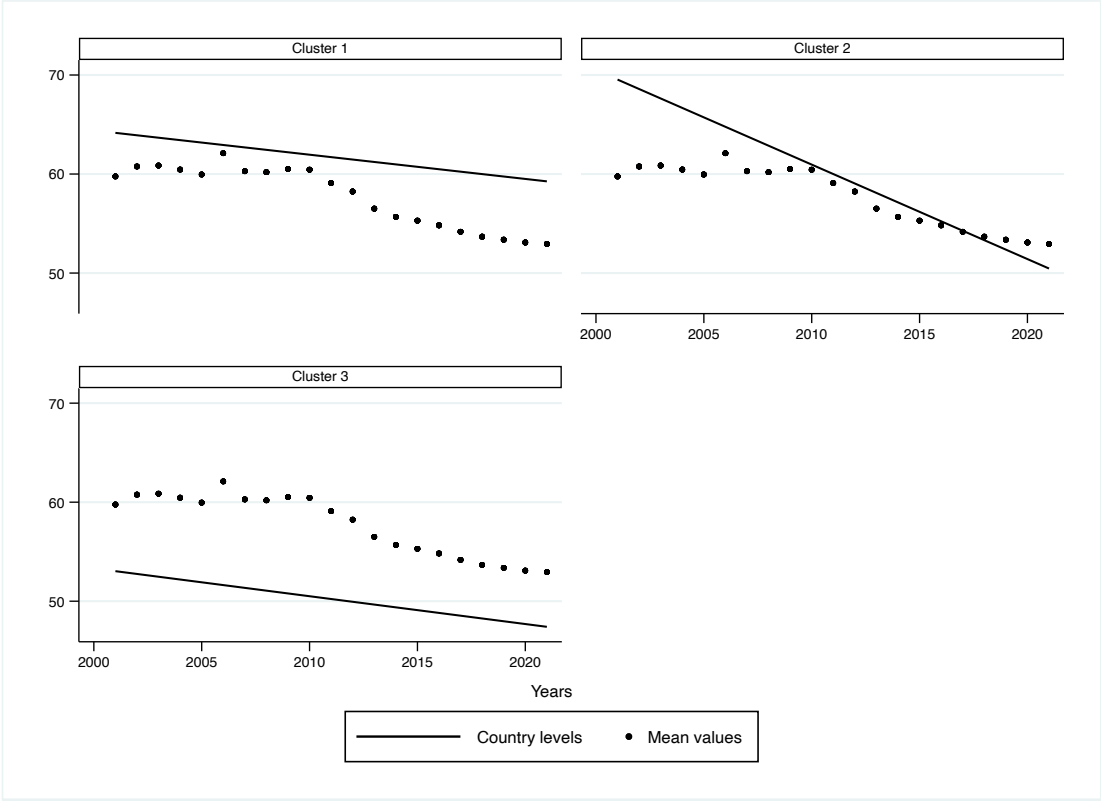
(a) Country levels are the linear fit of the observed values.
Source: Author's elaborations

Figure 2: Private health expenditures, percentage of GDP



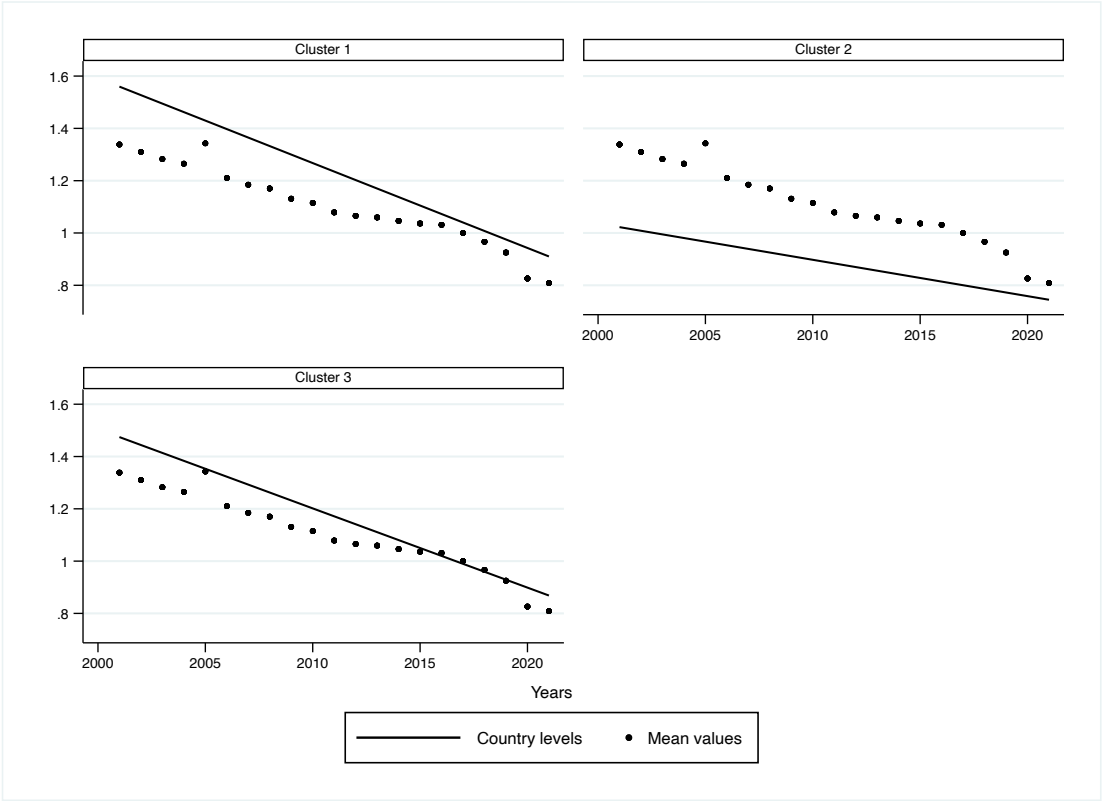
(a) Country levels are the linear fit of the observed values.
Source: Author's elaborations

Figure 3: Public pharmaceutical expenditures, percentage of total health expenditures



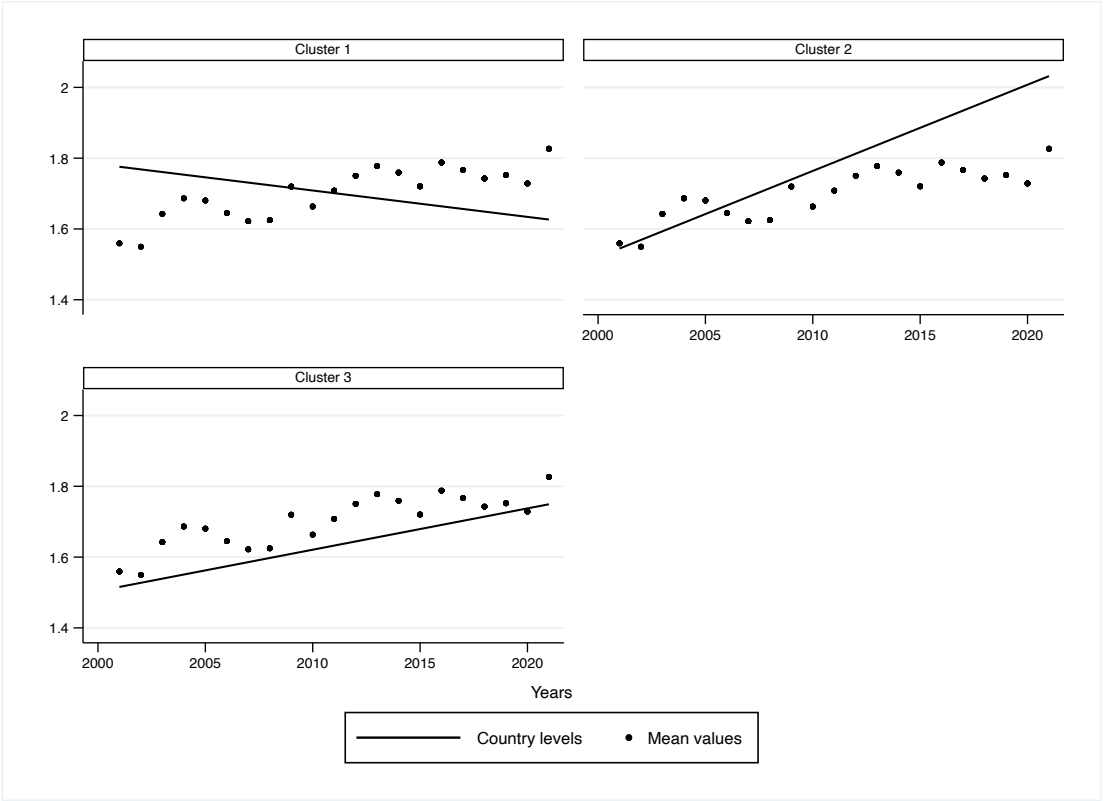
(a) Country levels are the linear fit of the observed values.
Source: Author's elaborations

Figure 4: Beds in public owned hospitals, days per person



(a) Country levels are the linear fit of the observed values.
Source: Author's elaborations

Figure 5: Households out of pocket payments, percentage of GDP



(a) Country levels are the linear fit of the observed values.
Source: Author's elaborations

Table 15: Model-based clustering

Cluster 1	Cluster 2	Cluster 3
Austria (8)	Austria (13)	
	Belgium (5)	Belgium (16)
Czechia (5)	Czechia (5)	Czechia (11)
Denmark (11)	Denmark (8)	Denmark (2)
Estonia (10)	Estonia (5)	
Finland (12)	Finland (8)	Finland (1)
France (10)	France (4)	France (7)
Germany (11)	Germany (7)	Germany (3)
Greece (3)	Greece (18)	
Hungary (10)	Hungary (5)	Hungary (6)
	Iceland (2)	Iceland (2)
Italy (10)	Italy (4)	Italy (7)
Latvia (8)	Latvia (10)	Latvia (3)
Lithuania (13)	Lithuania (6)	Lithuania (2)
	Luxembourg (1)	Luxembourg (2)
Netherlands (10)	Netherlands (10)	Netherlands (1)
Poland (17)	Poland (2)	Poland (2)
Portugal (10)	Portugal (8)	Portugal (3)
Slovakia (5)	Slovakia (13)	Slovakia (3)
Slovenia (11)	Slovenia (9)	Slovenia (1)
Spain (12)	Spain (3)	Spain (6)
Sweden (12)	Sweden (2)	Sweden (7)
Switzerland (5)	Switzerland (11)	Switzerland (5)
United Kingdom (12)	United Kingdom (7)	United Kingdom (2)