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AUSTERITY REDUCES PUBLIC HEALTH INVESTMENT

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Austerity Reduces Public Health Investment

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Abstract

Public health investments help to prevent mortality and reduce health care costs. Yet very few studies have examined the determinants of preventive care investments across countries and over time. We develop a theory of health spending priorities contrasting preventive and curative care. Preventive care is unlikely to be prioritized by governments since it is a public good that requires the allocation of scarce resources in the present to generate diffuse benefits that unfold only in the long-term. As such, public health is a “quiet” policy that is not supported strongly by interest groups or public opinion. These characteristics have two implications: like other long-term investments, public health programs are particularly vulnerable to fiscal austerity, and prevention expenditures are not influenced by government partisanship since parties cannot attract votes with such low visibility, long term investments. We use a dataset covering 25 OECD countries from 1970 to 2018 to demonstrate that fiscal consolidations are negatively associated with the absolute level of preventive care and with its proportion relative to curative care. We also confirm that left governments are not more likely to invest in public health than right-wing governments. Finally, contributing to the literature on comparative health care analysis, we show that National Health Services systems maintain higher preventive care investments than Social Health Insurance systems.

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Keywords: preventive care; austerity; curative care; partisanship; long-term investment.

JEL Codes: C23; H41, H51, H61, I18

Résumé

Les investissements en santé publique contribuent à prévenir la mortalité et à réduire les coûts des soins de santé. Pourtant, très peu d'études ont examiné les déterminants des investissements dans les soins préventifs entre les pays et à travers le temps. Nous développons une théorie des priorités en matière de dépenses de santé qui oppose les soins préventifs aux soins curatifs. Il est peu probable que les gouvernements accordent la priorité aux soins préventifs, car il s'agit d'un bien public qui nécessite l'allocation de ressources rares dans le présent pour générer des avantages diffus qui ne se déploient qu'à long terme. En tant que telle, la santé publique est une politique "discrète" qui n'est pas fortement soutenue par les groupes d'intérêt ou l'opinion publique. Ces caractéristiques ont deux implications : comme d'autres investissements à long terme, les programmes de santé publique sont particulièrement vulnérables à l'austérité budgétaire, et les dépenses de prévention ne sont pas influencées par l'idéologie du parti au pouvoir puisque les partis ne peuvent pas attirer les votes avec des

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investissements à long terme aussi peu visibles. Nous utilisons un ensemble de données couvrant 25 pays de l'OCDE de 1970 à 2018 pour démontrer que les consolidations budgétaires sont négativement associées au niveau absolu de dépenses en soins préventifs et à leur proportion par rapport aux soins curatifs. Nous confirmons également que les gouvernements de gauche ne sont pas plus susceptibles d'investir en santé publique que les gouvernements de droite. Enfin, nous contribuons à la littérature sur l'analyse comparative des soins de santé en démontrant que les systèmes de services nationaux de santé maintiennent des investissements en soins préventifs plus élevés que les systèmes d'assurance sociale.

Mots-clés: soins préventifs ; austérité ; soins curatifs ; partisanerie ; investissement à long terme.

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Introduction

The COVID-19 pandemic highlighted the importance of public health services to prevent diseases and provide health security for entire populations (Heymann and Shindo, 2020; Lal et al., 2021). More generally, public health programs help prevent mortality, generate substantial health benefits, and reduce health care costs (Mays and Smith, 2011; Bernet et al., 2018; Masters et al., 2017; Merkur et al., 2013). Yet, health professionals and organizations routinely deplore the lack of funding for public health programs (Wise and Nutbeam, 2007).

The OECD, Eurostat, and the World Health Organization jointly define “prevention and public health services as services designed to enhance the health status of the population as distinct from curative services, which repair health dysfunction” (OECD, Eurostat, and World Health Organization, quoted in Rechel, 2019).¹ There is a clear dividing line between preventive and curative measures. Curative expenditures have evident short-term consequences for individuals and are likely to be high on the priority list of voters and governments. Prevention, on the other hand, is less visible, less personal, and more oriented towards the long-term. The two functions are also of very different magnitude. In 2019, for instance, the United States devoted 0.5% of its GDP to public preventive care, compared to 10.4% for public curative care (OECD, 2021).

Few studies have examined the determinants of preventive care investments across countries and over time. Public health investments have been overlooked by economists, political scientists, and health policy analysts (Rechel, 2019). To our knowledge, the only quantitative studies of the determinants of disaggregated health care expenditures, including preventive care, have been conducted by Vitor Castro (2017) and Vitor Castro and Rodrigo Martins (2018). Both studies use the OECD Classification of the Functions of Government (COFOG) to conduct cross-national comparisons of the different types of

¹ In this article, we use preventive care and public health interchangeably.

health expenditures. These studies do not propose and test theories specifically related to preventive care. Bernd Rechel (2019) and Michael Gmeinder, David Morgan, and Michael Mueller (2017) find that public health investments in Europe proved particularly vulnerable to economic constraints following the 2008 recession. These descriptive studies, however, do not model the determinants of preventive care expenditures.

In this article, we develop a theory of health spending priorities to account for variations in public health investments between countries and over time. We argue that the design (temporal orientation and risk coverage) and the social salience of a policy determine if it is likely to be prioritized by governments. Preventive care is not favored in this respect since it constitutes a public good that involves the allocation of scarce resources in the present to generate benefits unfolding only in the long-term. As such, public health is a “quiet” policy that is not supported strongly by interest groups or public opinion (Busemeyer et al., 2020; Culpepper, 2010). These characteristics have two implications: 1) like other long-term investments (Breunig and Busemeyer, 2012; Bamba et al., 2020), public health programs are particularly vulnerable to fiscal austerity; 2) prevention expenditures are not influenced by government partisanship since parties cannot attract votes with such low visibility investments.

Despite these structural impediments to preventive care spending, some governments invest more than others in public health, as is suggested by the literature on health care systems (Trein, 2017; Rechel et al., 2013; Allin et al., 2004) or a better able to institutionalize public health agencies (Boswell et al., 2019). We find indeed that National Health Services (NHS) systems are more likely than Social Health Insurance (SHI) systems to sustain investments in preventive care.

This article offers a first account of the determinants of public health expenditures and contributes more broadly to the literature on long-term public investments. It highlights the weight of fiscal pressures on the provision of public health, the importance of health institutions, and the irrelevance of partisan differences on such matters. The following two sections present a theory of expenditure prioritization

contrasting curative care and preventive care, and a discussion on the role of health care systems in the promotion of preventive care. The fourth section presents the data and the methods, and the fifth shows the results.

Public Health as Quiet Long-term Investment

We build on comparative public policy literature to develop a theory of policy prioritization applied to preventive and curative care. We contend that policy design (the temporal orientation and the nature of benefits) and the salience of a policy (among the public and interest groups) are two crucial factors that influence political parties' preferences and a policy's resilience to fiscal pressures.

This article builds on an emerging comparative political economy research program on the politics of long-term public investments. It focuses on governments' ability to prioritize public policies that are beneficial in the long run, such as investments in education, research and development, and environmental protection, as opposed to policies with immediate, visible and tangible impacts for voters, such as social services, cash benefits, and tax cuts (Finnegan, 2019; Healy and Malhotra, 2009; Jacobs, 2011; Jacobs, 2016; Jacques, 2021b; Lindvall, 2017). We conceive public health as a long-term investment. Such investments are defined by an intertemporal trade-off: they involve allocating scarce resources in the present to programs whose benefits unfold in the long term. Disaster prevention is a quintessential example of long-term investment since it lowers the likelihood of natural disasters in the future and reduces their adverse consequences should they happen. Disaster relief, by contrast, has an immediate and highly visible effect. Relief is readily approved by voters, whereas prevention tends to be neglected, even though disaster prevention brings a significantly higher return on investment than relief (Healy and Malhotra, 2009). Similarly, preventive health care offers few short-term benefits to voters and its effects take time to unfold, whereas curative care expenditures offer immediately visible short-

term services to patients and generates income for practitioners and institutions. In situations of limited resources, policymakers need to choose between preventive and curative care, often at the expense of the former (Cairney and St Denny, 2020). Moreover, some form of preventive care may involve cost imposition in the short term, notably by limiting individual freedom of choice in lifestyles (Gostin and Wiley, 2016).

The long-term orientation is not the only important characteristic to explain policy prioritization; the nature of the benefits matters as well. The literature on policy feedback proposes that universal policies covering the entire population are particularly popular and likely to be prioritized by governments (Laenen, 2018; Nelson, 2007). In most advanced democracies, curative health care is universally covered by public (or mandatory private) insurance. Health care is a life-cycle risk whose incidence is determined at least as much by age as by socio-economic status (Jensen, 2014). Moreover, the perception of the risk of getting sick is shared across citizens of different classes and the beneficiaries of health care services are seen as deserving of public benefits, much more so than the beneficiaries of other public services such as unemployment insurance (Jensen and Petersen, 2017). Curative care thus responds to a life-cycle risk that is generally covered by universal programs: this magnifies its social salience and it has political consequences.

In contrast, preventive care is a public good: the benefits of a healthy population in the future are diffuse, they cannot be reduced to private benefits for an individual or a group and, as in the case of clean air, governments cannot exclude anyone from benefiting from public health. Individuals and governments have fewer incentives to pay for public health investments and public health has no obvious constituency to support it (Tuohy and Glied, 2012).

The nature of benefits and their long-term orientation contribute to the salience of a policy. Several studies distinguish between “loud” and “quiet” policies (Busemeyer et al., 2020; Culpepper, 2010): loud policies are salient issues that impose visible costs and offer definite benefits that mobilize

voters, groups, and parties. In contrast, quiet policies remain below the radar screen. Some of the loud policies are largely consensual, others are more divisive and debated. Curative health care is loud and salient in the public discourse since health care systems cover a risk shared by all citizens. As such, most citizens, regardless of their income or ideology, favour additional spending for curative health care (Wendt et al., 2010; Jensen, 2014; Jensen and Petersen, 2017). Other loud policies are more divisive, as it is the case for redistributive social policies, such as unemployment insurance, which offers short-term benefits to a subset of the population and is more likely to be supported by left-wing voters and parties than by the right, since it protects more vulnerable people, with higher risk of losing their employment (Jensen, 2014; Rehm, 2016).

Quiet policies are not salient in the public discourse since they tend to be characterized by low levels of spending, an uncertain distribution of costs and benefits, or appear technical and difficult for the public to comprehend. Policy choices about quiet policies tend to reflect the demands of the coalition of groups that prevail in the policy field (Culpepper, 2010). In contrast to some other quiet policies, influent interest groups generally do not have much to gain from investments in preventive care since it is a public good whose benefit unfolds in the long-term. Moreover, the amount of money invested in preventive care remains relatively low. Interest groups have a larger stake in curative health care since large sums of public expenditures are distributed between powerful professional groups and a network of organizations.

Table 1 summarize this theory of policy prioritization, and places curative and preventive health expenditures in very different locations. Contrary to curative health care, which is not only short-term but also salient (loud) among the public and interest groups, preventive care is both long-term and quiet. It is thus likely to figure at the bottom of governments' priority list, not only because its benefits unfold in the long term, but also because it is a quiet public good with limited public and interest group support.

Table 1. Theoretical framework: contrasting curative and preventive care’s prioritization.

		Curative health care	Preventive care
Policy design	<i>Temporal horizon</i>	Short-term benefits	Benefits unfold in the long term
	<i>Nature of benefit</i>	Personal benefits for a risk faced by all citizens	Public good
Social salience	<i>Interest group support</i>	Strong	Weak
	<i>Public opinion</i>	Loud policy: High support	Quiet policy: Weak support
Political consequences	<i>Partisan preferences</i>	Left-right convergence in favor of higher spending	No partisan preferences
	<i>Resilience to austerity</i>	Strong	Weak

As can be seen in Table 1, differences in policy design have observable political consequences. We focus on two of these consequences: resilience to austerity and partisan preferences. By forcing a difficult arbitration between budget categories, situations of fiscal austerity reveal governments’ priorities and how they accommodate the preferences of different voters and groups. Studies in comparative political economy have shown that governments tend to choose the path of least resistance when they implement fiscal austerity measures. They disproportionately cut policies whose benefits unfold in the long-term and protect programs supported by influential constituencies. Indeed, several studies have shown that long-term capital investments are particularly vulnerable to episodes of fiscal austerity (Bamba et al., 2020; Jacques, 2021a; Breunig and Busemeyer, 2012; Streeck and Mertens, 2011). No study has analyzed systematically the effect of fiscal pressures on preventive care investments, but Rechel (2019) and Gmeinder et al. (2017) have noted their decline in Europe in the years following the 2008 recession, a period characterized by large-scale episodes of austerity (Alesina et al., 2019). As a

quiet and long-term public good, we expect preventive care investment to be particularly vulnerable to austerity episodes.

H1a. Fiscal consolidations are associated with a decline in the absolute level of preventive care investments.

If our theory of expenditure prioritization is right, we should also find that curative health care expenditures are more resilient to episodes of austerity than preventive care. Governments should protect curative care budgets as much as possible since it is a loud policy covering widely shared life-cycle risks and offering benefits in the short term. We thus expect that the proportion of health-care budgets allocated to preventive care relative to curative care will decline during episodes of austerity.

H1b. Fiscal consolidations are associated with a decline of preventive care relative to curative health care.

One could expect that left-wing parties' preference for a more interventionist state would be translated into an increase in preventive care investments during the tenure of left governments. Left governments are indeed driven by coalitions for equality (Brady, 2009), are concerned by social inequalities in health, and may try to reduce them by investing in preventive care (Lynch, 2020). Systematic reviews have found that left governments are associated with higher social expenditures (Potrafke, 2017), but they are not necessarily associated with more generous health care expenditures (Falkenbach et al., 2020), since both left and right governments follow the public's preferences and support curative health care spending (Jensen, 2014). Since it covers a widely shared life-cycle risk, curative care is a valence issue: all parties are in favor of health care spending. Instead of proposing clear distinction in terms of levels of government involvement in health care, parties compete to position themselves as the best managers of the health care system (Immergut, 2021).

Preventive care investments are not as broadly supported and, as a quiet long-term investment with little constituency, we do not expect that government partisanship will matter. Rational parties can be policy seekers proposing policies to please their core constituencies, or they can be vote-seekers proposing policies to attract the median voter to win elections (Strom, 1990). However, both the median voters and any party's core constituencies are not likely to hold a strong preference for higher preventive care investments since it is a quiet and long-term investment. Left-wing parties are more likely to prioritize other types of expenditures such as redistributive social policies, while right-wing parties may prefer lower taxes (Brady, 2009). Both these policy choices are leaving fewer public resources to invest in preventive care. The only study of the cross-national determinants of disaggregated health care expenditures including preventive care does not find that government partisanship influences preventive care spending (Castro and Martins, 2018). We thus pose the following hypothesis:

H2. Government partisanship is not associated with the level and share of preventive care investments.

Institutions Matter: The Role of Health Care Systems

The institutions governing health care systems are likely to influence the level of expenditure allocated to preventive care. We contrast National Health Services (NHS), characterized by state-based regulation and financing, with the Social Health Insurance (SHI) systems giving an important role to social partners in the financing (and sometimes regulating) of health care (Böhm et al., 2013). NHS exist in the Nordic countries, Southern Europe, the United Kingdom, Australia, and Canada, whereas SHI are present in German-speaking countries, France, the Benelux, Japan, and Eastern Europe following their post-communist reforms (Immergut, 2021). Since both systems have advantages and disadvantages in the

financing of preventive care, we thus pose competing hypotheses that we are verifying in the empirical sections.

On the one hand, some argue that NHS have more comprehensive and ambitious national public health activities than SHI, due to their more inclusive, population-based orientation (Rechel et al., 2013). Allin et al. (2004) contend that tax funded systems favor a population-based approach via national-level legislation to regulate public health systems, whereas the fragmented decision-making process in SHI leads to lower levels of preventive care spending. While the national government can coordinate common policies in preventive and curative care in NHS systems, the multiplicity of societal actors in SHI systems increases the difficulty of coordination towards a population-based approach (Wagstaff, 2009). The societal actors that govern SHI systems would also have a preference for local, individual-based curative health care, rather than preventive care (Trein, 2017). Philip Trein (2017) suggests that public health policies are more likely to be subordinated to curative health functions in SHI systems. Based on these arguments, we pose the following hypothesis:

H3. All other things being equal, preventive care investments are higher in National Health Services systems.

On the other hand, the political economy of contributory financing may suggest that SHI systems are better equipped to maintain higher investments in preventive care than NHS systems. SHI are mostly funded by social security (health insurance) contributions, whereas NHS are funded by general taxation. To ensure that contributions match costs, contributions increase, sometimes automatically, to cover the rising expenditures of health care systems (Manow, 2010). Automatic increases allow politicians to deflect the blame for higher contributions and to point towards economic or demographic factors that they cannot control, whereas tax increases inevitably attract blame (Manow, 2010). In SHI, citizens perceive a direct link between contributions and benefits and since most systems are Pay-as-you-go,

retrenchment would involve cutbacks to benefits that have already been paid for. Hence, the most common pattern to alleviate fiscal pressures in welfare states relying on social security contributions is to increase contributions rather than to cut benefits (Truchlewski, 2020).

In NHS systems, by contrast, taxes do not increase with the cost of the health care system, which accentuates fiscal pressures on public finances, incentivizing governments to implement retrenchment measures to contain rising costs. Moreover, in tax-based systems, ministries of Finance are more likely to exert a strong influence on the budget process and to have the necessary leeway to impose cutbacks. In contrast, in systems based on social security contributions, social insurance and health care are more isolated from the formal budget process since they are paid for by social security contributions (Bonoli and Palier, 2000). Finance ministers cannot easily impose cutbacks and it is often a minister with a pro-spending bias that is responsible for the funding of health and social insurance in SHI systems (Manow, 2010). Thus, SHI systems are more likely to be isolated from political pressures on fiscal policies that involve a downward pressure on preventive care. Indeed, adopting a social health insurance financing rather than tax financing leads to 3-4 percent higher health expenditures per capita on average (Wagstaff, 2009). Based on this counterargument, we pose the following contending hypothesis:

H4. All other things being equal, preventive care investments are higher in Social Health Insurance systems.

Data and Empirical Strategy

Measuring preventive care

There are two international datasets on preventive care in advanced democracies: Eurostat and the OECD classification of health expenditures by functions.² Both rely on the System of Health Accounts of 2011, which aims to harmonize the measurement of the expenditures allocated to different health functions between countries. These datasets have only been made available quite recently, explaining the paucity of studies on the topic (Gmeinder et al., 2017). Based on national reports validated by national ministries of Health, they share the same definition of preventive care. These services designed to enhance the health status of the population are covered through two levels of interventions consumed either by individuals or included as part of collective services: primary prevention includes measures aimed at anticipating the emergence of diseases and lessening their severity, secondary prevention involves interventions such as screening, aimed at detecting and treating diseases.³ Tertiary prevention, which is closer to curative care, is excluded from the measure of preventive care (Gmeinder et al., 2017).

This definition excludes some programs such as the improvement of health through active transport programs (Rechel et al., 2013). Moreover, some public health activities, like vaccinations made by general practitioners may be hidden in primary care budgets (Rechel, 2019). Thus, prevention expenditures tend to be underestimated and there are between-country discrepancies in the inclusion of some activities in prevention (Gmeinder et al., 2017). Moreover, as for other country-level datasets, the measurement is less precise when health care systems are decentralized and there are large variations in public expenditures between the regions of a country (Ammi et al., 2021; Rechel, 2019). Still the Eurostat and OECD datasets remain the best available (Rechel, 2019).

We focus our analysis on the OECD dataset since the series are considerably longer (N=665) than the Eurostat dataset (N=283). Still, we replicate the analysis in the appendix using the Eurostat dataset

² The WHO also has a dataset, but the time series of 3 to 5 years are too short for a quantitative analysis.

³ Examples include information and counseling programmes, immunization and early disease detection programmes, health monitoring programmes, epidemiological surveillance, and disaster preparation.

and find similar results, which is not surprising since the correlation between the two series is high ($r=0.85$).

As a dependent variable, we use the level of public investment⁴ in preventive care, expressed as a proportion of GDP.⁵ The length of this series differs between countries. It is longest in Canada, France, and Germany (48 years) but very short in the United Kingdom (5 years). The series start in 2000 for most countries and ends in 2017. The OECD identifies breaks in some series; we coded the data as missing for the years before the break occurs to remove artificial variations. In a few instances, we filled missing data between years with linear interpolation.

We also model the effect of fiscal consolidations on the proportion of public expenditures allocated to preventive care relative to public curative care, allowing us to study a trade-off between short-term and long-term investments in health care. Curative care expenditures are measured as inpatient and outpatient curative care expenditures, the expenditure categories that are closest to curative care.⁶ This contrasts with the other health care functions in the COFOG (long-term care, ancillary, medical goods, and administration) that are not as explicitly related to curative care. The series of curative care ($N=581$) is a bit shorter than preventive care ($N=665$), as it is unavailable in some countries like the United States. The ratio is calculated as preventive care/ (inpatient care + outpatient care) *100. To maximize the size of our dataset, we also model preventive care as a proportion of total public health care expenditures.

Figure 1 presents the evolution of preventive care expenditures in 25 OECD countries from 1970 to 2018, expressed as a proportion of GDP, as well as the ratio of preventive care relative to curative care. These countries are selected on the availability of the independent variables. The series of

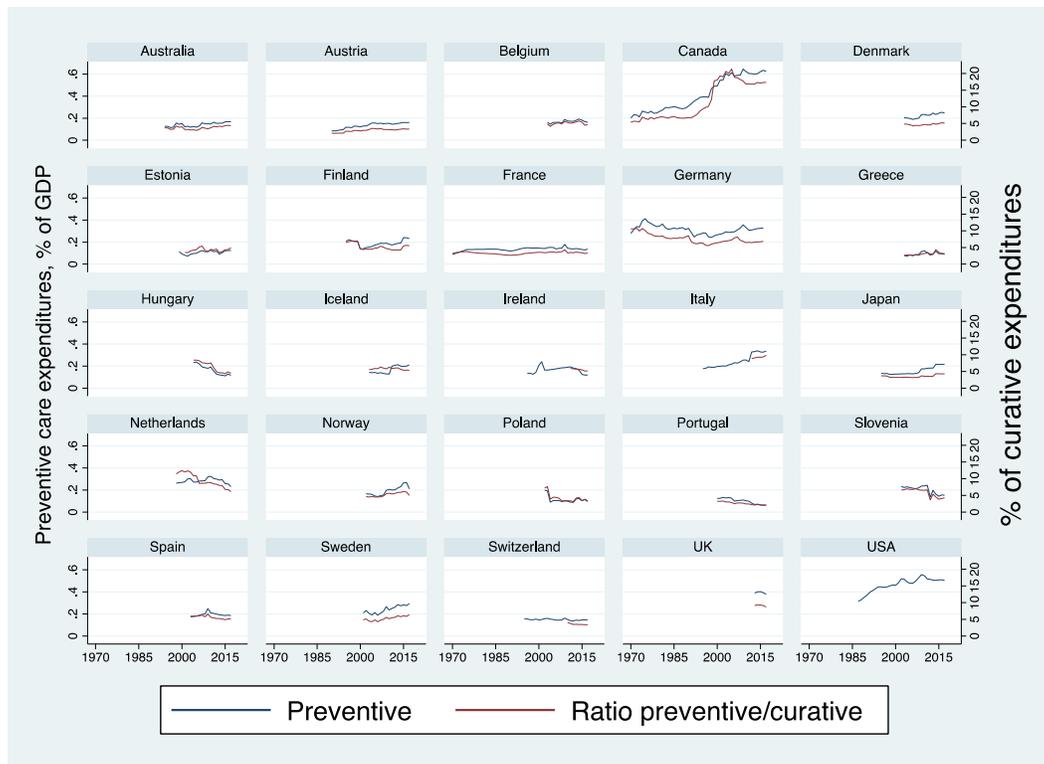
⁴ Public investments represent on average 80% of preventive care expenditures, the rest being carried by employers or by charities.

⁵ Using preventive care per capita does not alter the results.

⁶ In the WHO dataset, both inpatient and outpatient curative care are included within the same category labelled « curative care ».

preventive care has an average length of T=22 and the mean is 0.22% of GDP. On average, preventive care represents 7.73% of curative health care expenditures but only 4.3% of total public health care expenditures. It is difficult to observe a clear pattern distinguishing preventive care investments between NHS and SHI in Figure 1. Some NHS systems, like Canada, have high expenditures, whereas public health expenditures are growing in countries such as Italy, Norway, and Sweden, while Australia and Portugal maintain very low preventive care investments. Levels of expenditures differ significantly between SHIs: Germany and the Netherlands maintain above average preventive care investments, whereas Austria and Switzerland keep below average investments. The United States has comparatively high preventive care investments. Note that it is not only a reflection of their higher level of overall health spending, since the ratio of preventive care relative to the total public health care expenditures is also high.

Figure 1. The evolution of preventive care expenditures, 25 OECD countries, 1970-2018



Measurement of the Independent Variables

We measure fiscal austerity with the narrative approach to fiscal consolidation, which has become the most common measure of fiscal austerity in comparative political economy. To identify the precise amount of tax increases and spending cuts implemented to reduce budget deficits relative to a baseline of no policy change, documents such as budget speeches, reports from national fiscal authorities and from international organizations are consulted (Alesina et al., 2019). The measure, which is expressed as a percentage of GDP, does not include policy changes that were announced but not implemented. We focus on the amount of spending cuts rather than tax increases since we are explicitly interested in how cuts may affect policy choices, whereas we are agnostic about the effect of tax increases on spending choices.

This measurement strategy is significantly better than the alternative which relies on variations to the cyclically adjusted primary balance (CAPB). The CAPB can be affected by many exogenous factors that are unrelated to the decision to implement consolidations. It cannot distinguish between deficit-driven consolidations from adjustment to the primary balance that are driven by a desire to cool down an overheated economy. Identifying consolidations based on the CAPB involves setting an arbitrary threshold of changes in deficits at which a consolidation would be occurring. Guajardo et al. (2014) show that the narrative approach offers a more accurate identification of austerity episodes.

However, the narrative approach is constrained by data availability since it is only available in 17 countries from 1980–2014 (Alesina et al., 2019; Gupta et al., 2016).⁷ Considering the relatively small sample of our dependent variable, we increase the number of countries covered by creating an additional

⁷ The countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Portugal, Spain, Sweden, the United Kingdom and the USA. There are 61 episodes of fiscal consolidation, most of which last more than a year, for a total of 204 country-years of spending-based fiscal consolidations.

measure of fiscal consolidations based on changes to cyclically adjusted expenditures, but only for the countries that not covered by the narrative approach. Country-years are considered as an episode of fiscal consolidation if the cyclically adjusted expenditures are reduced by more than 0.5% of GDP. These country years take the value of the reduction of the cyclically adjusted expenditure at T-0 relative to T-1. Country-years with increases to cyclically adjusted expenditures or smaller cuts than 0.5% of GDP are coded as 0. This threshold of 0.5% follows the identification strategy of Alesina and Ardagna (2010) to remove small adjustments that may be mostly influenced by exogenous factors unrelated to the decision to consolidate. This allows us to add Estonia, Greece, Iceland, Hungary, Norway, Poland, Slovenia, and Switzerland to our analysis. In the empirical analysis, we present models including only the 17-country measure of consolidations based on the original narrative approach along with additional models that combine the two data sources to create a measure of consolidation available in 25 countries.

We use two measures of government partisanship. The first is the classical cabinet share of different parties associated with the right or the left, based on the Comparative Political Dataset. This measure assumes that left or right parties do not change their ideology over time and across countries. The second measure adjusts the intensity of the left-right orientation of each government in different countries and overtime by relying on the Comparative Manifesto Project to generate a time-variant government right-left index (Seki and Williams, 2014).

We measure health care system types with dummy variables. We distinguish between the private health care system of the United States, the National Health Services (NHS) characterized by state-based regulation and financing and the Social Health Insurance (SHI) systems giving an important role to social partners in the financing of health care. In the appendix, we also present models using 5 categories of health care systems that are distinguishing between two subcategories of NHS and SHI systems (Böhm et al., 2013).

We control for demographic and economic variables that should be influencing health care expenditures such as the log of GDP per capita, GDP growth, unemployment rate and the share of the elderly population (Chernew and May, 2012). We also control for economic conditions to ensure that the effects we find are driven by spending cuts rather than economic crises. Since health expenditures may be influenced by the health of the population (Thorpe and Howard, 2006), we also control for a measure of premature mortality (potential years of lives lost).⁸ Finally, we control for election years since theories of political budget cycles suggest that governments are more likely to increase curative care and current consumption relative to long-term investments in the year before the elections (Datta, 2020; Gupta et al., 2016).⁹ The descriptive statistics and data sources are presented in the appendix.

Modelling choices

Dickey-Fuller and Philipps-Perron tests reveal that fiscal consolidations, GDP growth and government partisanship are stationary, while potential years of lives lost are stationary around a trend. The results of the unit root tests suggest that unemployment rate, the share of the elderly population and the log GDP per capita have a unit root. We first difference these three non-stationary control variables to ensure their stationarity and to avoid spurious inferences (Philips, 2018; Philips, 2021).

The results of these tests are uncertain for the dependent variables since some tests reveal a unit root, while others point towards a stationary series. Stationarity tests are notoriously unreliable in small samples, especially when the series are strongly autoregressive (Webb et al., 2020), as is the case for the

⁸ Note that controlling for the age standardized death rate (from all causes) per 100 000 inhabitants rather than potential years of lives lost does not alter the results.

⁹ Studies interested in the politics of long-term investments also highlight the role of electoral competition. Electoral competitiveness should influence parties' decisions to propose long-term investments, since political parties fearing for their survival in office should be more attentive to voters' preferences for policies beneficial in the short term than parties that are almost certain to win the next election. Political parties in safe electoral situations should be encouraged to invest in the future because they are less vulnerable to short-run voter dissatisfaction (Jacobs, 2016). However, our models reveal that preventive care is not influenced by electoral competition, measured as the probability that a government remains in office after the next election. This is possibly because preventive care is a quiet long-term investment.

preventive care series (and its ratio relative to curative care). In these situations, unit root tests are biased in favor of finding unit roots (Webb et al., 2020; Lebo and Kraft, 2017). We thus believe that preventive care (and its ratio) is more likely to be stationary than to have a unit root, but we remain cautious and present two models, one assuming it is stationary (equation 1) and the other assuming it has a unit root (equation 2). We represent the determinants of preventive care investment with an autoregressive distributed lag model, using the level of spending as a dependent variable. Our main models follow equation 1:

$$Y_{t-0} = a_0 + \alpha_1 Y_{it-1} + \beta_1 fiscal_{it-0} + \beta_2 fiscal_{it-1} + \beta_3 partisan_{it-0} + \beta_4 partisan_{it-1} + \beta_5 hsystem_{it-0} + \beta_6 controls_{it-0} + \beta_7 controls_{it-1} + \psi_i + \tau_{it} + \varepsilon_{it} \quad (1)$$

Y is either the measure of preventive care expenditures as a proportion of GDP or the ratio of preventive care relative to curative care/total health care expenditures. We use a lagged dependent variable since we are interested in modelling the dynamic effect of the determinants of preventive care and its omission would lead to an omitted variable bias (Wilkins, 2018). α_0 is a constant. β_1 to β_5 are the coefficients of the independent variables of interest. We believe that we must include the contemporaneous and the first autoregressive coefficients of the independent since type 1 error are common if the analyst does not include the lagged value of the independent variables to model a strongly autoregressive stationary series (Philips, 2021). Because our series are relatively short, we choose not to include longer lag lengths.

We include a set of random intercepts ψ_i . We prefer to use random effects rather than country fixed effects for several reasons. First, Hausman tests reveal that within and between effects are not different, which militate in favor of using random effects. Second, fixed effects would not allow us to estimate the coefficients of the types of health care system types since these are measured with time-

invariant country dummies. Third, the use of a lagged dependent variable and fixed effects would produce a Nickell bias in such short series (Clark and Linzer, 2015).

Finally, we include a country-specific time trend parametrized by τ_{it} to model the upward trend in some preventive care series caused by the introduction of population-based screening programs (Gmeinder et al., 2017) and to ensure that potential years of life lost is stationary. This model ensures that the error term ε is white noise. While the country specific trend helps to identify the effect of austerity, it is not be included in models focused on identifying the effects of health care systems since the trend removes the variance predicted by the time-invariant health care system dummies.

Equation 1 will be unbiased only if the dependent variable is stationary. Since we are uncertain about the order of integration of the dependent variable, we also model equation 2 in the appendix, which uses the first difference of the dependent variable and of its lag but includes the levels of the stationary independent variables:

$$\begin{aligned} \Delta Y_{t-0} = & a_0 + \Delta a_1 Y_{it-1} + \beta_1 fiscal_{it-0} + \beta_2 fiscal_{it-1} + \beta_3 partisan_{it-0} + \beta_4 partisan_{it-1} \\ & + \beta_5 hsystem_{it-0} + \beta_5 controls_{it-0} + \beta_6 controls_{it-1} + \psi_i + \tau_{it} + \varepsilon_{it} \end{aligned} \quad (2)$$

The unusual model of equation 2 differs from an error correction model since we do not include a lagged dependent variable in levels and because we present our independent variables only in levels. Error correction models are advisable only if the series of interest have a unit root and are cointegrated with the dependent variable (Lebo and Kraft, 2017), which is not the case in this article since fiscal consolidations and government partisanship are stationary and thus cannot be cointegrated with preventive care (Philips, 2018). In the appendix, we also present a regular first differenced model which includes all the variables in first differenced form, without a lagged dependent variable.

Results

Table 2 presents the results of the autoregressive distributed lag models based on equation 1. Both measures of spending cuts during austerity episodes are unequivocally negatively correlated with the levels of preventive care investments and its ratio relative to curative care or to total health expenditures. Model 2 reveals that a reduction of 1% of GDP of expenditures is associated with a decline of 0.1 percentage points of the ratio of preventive care relative to curative health care expenditures. In contrast, the effect of government partisanship is never significant. In fact, austerity is the only variable that is significantly correlated with preventive care in all models. Its effect is not dependent on sample or measurement, since both measures of consolidations yield the same results.

The effects of the type of health care systems in models 1 to 6 are biased by the country-specific time trend, which catches the stronger upward trend in preventive care investments witnessed in NHS systems. Models 7 to 9 remove the country-specific time trend to compare the effects of health care system types, using SHI as the reference category. Model 7 uses preventive care expenditures as a dependent variable while models 8 and 9 use its ratio relative to curative care. Model 7 reveals that NHS maintain higher preventive care than SHI. The appendix reveals that the effect is driven by the National Health Insurance systems of Australia, Canada, Ireland and Italy that maintain higher preventive care expenditures than both types of SHI. The United States, the only private health care system type, generally spends more in preventive care. However, model 8 reveals that NHS systems do not maintain higher ratios of preventive relative to curative health expenditures. Note that both measures of consolidation maintain their negative effect on the level and the ratio of preventive care expenditures in models 8 and 9, revealing that the effect is robust to removing the country trends.

In the appendix, we present several robustness checks. First, we run equation 2. It reveals that fiscal consolidations maintain their significant effect on preventive care and on its ratio relative to

curative care, but not relative to total health care expenditures (significant at $p=0.1$ for additive measure). With equation 2, NHS systems still maintain more expenditures than SHI. We also tested the effect of the cabinet share of left parties, which is not associated with preventive care either. Second, we ran fixed effects model, with the form of equation 1. We find that both measures of spending cuts have a significant effect on preventive care, but the significance of their effect on the ratios falls to $p=0.1$. Third, we ran first differenced models that confirm the effect of spending cuts on preventive care and on its ratio.

Table 2. Autoregressive distributed lag models with random effects, 17 to 24 OECD countries.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Preventive	Preventive/curative	Preventive/total	Preventive	Preventive/curative	Preventive/total	Preventive	Preventive/curative	
Lagged DV	0.878*** (0.0298)			0.827*** (0.0364)			0.993*** (0.0118)	0.988*** (0.0102)	0.996*** (0.00818)
NHS	-1.303* (0.792)	-52.27* (29.90)	-23.45*** (8.382)	-2.068** (0.993)	-46.54 (31.11)	-29.73** (11.66)	0.00491** (0.00232)	0.133 (0.103)	0.116 (0.139)
Private	1.433*** (0.527)		78.93*** (10.12)	0.877 (0.666)		92.36*** (10.13)	0.00901** (0.00408)		
Spending cuts t-0	-0.0046*** (0.00121)	-0.0964** (0.0411)	-0.0428** (0.0199)						-0.0501** (0.0221)
Spending cuts t-1	0.00106 (0.00203)	0.0218 (0.0593)	0.0221 (0.0379)						0.0359 (0.0328)
Left-right index t-0	-0.000107 (0.000133)	-0.00640 (0.00557)	-0.00109 (0.00238)						
Left-right index t-1	6.56e-05 (0.000100)	0.000963 (0.00401)	-6.26e-05 (0.00199)						
Spending cuts (add.) t-0				-0.0042*** (0.00115)	-0.0585** (0.0259)	-0.0424** (0.0166)	-0.0031*** (0.00106)	-0.0364* (0.0214)	
Spending cuts (add.) t-1				4.58e-05 (0.00159)	0.00245 (0.0421)	0.00342 (0.0270)	0.00124 (0.00111)	0.0168 (0.00114)	
Right government t-0				-7.18e-05 (5.00e-05)	-0.00341 (0.00289)	-0.00150 (0.000979)	-6.25e-05 (4.68e-05)	-7.32e-05 (4.92e-05)	-0.00300 (0.00266)
Right government t-1				5.45e-05 (3.54e-05)	8.89e-05 (0.000775)	0.000522 (0.000620)	6.45e-05* (3.74e-05)	6.80e-05* (3.74e-05)	0.00155 (0.00128)
Δ log GDP/cap t-0	-0.0372 (0.232)	10.98 (13.05)	3.235 (4.031)	0.110 (0.200)	8.790 (9.102)	4.316 (3.641)	-0.254 (0.175)	-0.218 (0.196)	-7.490 (6.465)
Δ log GDP/cap t-1	0.540** (0.243)	11.29 (8.807)	9.448** (3.865)	0.373 (0.251)	5.013 (9.015)	8.433** (3.524)	0.0594 (0.205)	0.216 (0.180)	2.720 (6.001)
GDP growth t-0	-0.00117 (0.00235)	-0.0932 (0.105)	-0.0230 (0.0343)	-0.00154 (0.00198)	-0.0472 (0.0760)	-0.0219 (0.0331)	0.00162 (0.00146)	0.00103 (0.00169)	0.0678 (0.0577)
GDP growth t-1	-0.00402* (0.00209)	-0.0761 (0.0738)	-0.0746** (0.0327)	-0.00348 (0.00244)	-0.0324 (0.0813)	-0.0794** (0.0321)	-0.000793 (0.00207)	-0.00207 (0.00180)	-0.00799 (0.0589)
Δ Pop 65+ t-0	0.00256 (0.0112)	-0.0479 (0.225)	0.0978 (0.175)	-0.00702 (0.00611)	-0.237 (0.188)	-0.0585 (0.0958)	-0.00140 (0.00440)	0.000245 (0.00509)	0.137 (0.292)
Δ Pop 65+ t-1	-0.00343 (0.00933)	0.0530 (0.264)	-0.247 (0.234)	0.00485 (0.00591)	0.134 (0.213)	-0.0666 (0.125)	0.0102** (0.00509)	0.00665 (0.00563)	0.192 (0.243)
Δ unemployment t-0	0.00385* (0.00211)	0.0375 (0.0691)	0.0430 (0.0354)	0.00354** (0.00161)	0.0749 (0.0473)	0.0484** (0.0235)	0.00219 (0.00147)	0.00195 (0.00139)	-0.0180 (0.0586)
Δ unemployment t-1	-0.00225 (0.00160)	-0.0567 (0.0529)	-0.0215 (0.0266)	-0.00194 (0.00157)	0.00124 (0.0433)	-0.0156 (0.0220)	-0.00275* (0.00151)	-0.00214 (0.00133)	-0.0159 (0.0573)
Premature death t-0	1.06e-06 (7.83e-06)	-5.55e-05 (0.000296)	-6.59e-05 (0.000184)	7.47e-06 (7.30e-06)	0.000300 (0.000262)	7.78e-05 (0.000161)	5.63e-06 (6.93e-06)	3.30e-06 (7.28e-06)	0.000400 (0.000448)
Premature death t-1	6.42e-07 (9.85e-06)	-0.000300 (0.000361)	-5.76e-05 (0.000150)	-4.60e-06 (8.13e-06)	-0.000350* (0.000212)	-8.92e-05 (0.000147)	-5.28e-06 (6.42e-06)	-3.46e-06 (6.73e-06)	-0.000385 (0.000426)
Election dummy	-0.00128 (0.00239)	-0.0554 (0.0920)	-0.0297 (0.0382)	0.000584 (0.00210)	-0.00810 (0.0777)	-0.00723 (0.0326)	0.000279 (0.00217)	-5.19e-05 (0.00217)	-0.0601 (0.101)
Constant	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country trend	YES	YES	YES	YES	YES	YES	NO	NO	NO
Observations	317	258	317	422	348	422	422	348	259
Number of cty	17	16	17	24	23	24	24	23	16

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Fourth, we included a dummy variable in 2009 to control for the increase in preventive care expenditures during the vaccination campaigns of the H1N1 epidemic (Gmeinder et al., 2017). Although the dummy variables have a clear positive effect on all three dependent variables, the effect of health care system types and of fiscal consolidations remain unchanged.

Fifth, we reran models with the Eurostat dataset, which involves very short time series (N=108 to 180). Because of the short series, we do not include country fixed effects or country-specific time trends, which catches most of the variance when added to the lagged dependent variables. Fiscal consolidations have a negative impact on preventive care expenditures and their ratio (significant at $p=0.1$), while the additive measure only has a significant effect on preventive care expenditures, but not on their ratio. Health care systems type do not influence preventive care expenditures with the Eurostat data, quite possibly because it does not go far back in time.

Finally, we have studied the relations between our independent variables. We removed either government partisanship or fiscal consolidations from the models to ensure that the effects of these two variables are not influenced by the inclusion of the other. This does not alter the results. We also tested for an indirect partisan effect: most models do not reveal that right governments are more likely to engage in consolidations than left governments, confirming the findings of Hübscher and Sattler (2017) who show that the decision to consolidate is determined by fiscal pressures and electoral considerations more than by government ideology. Moreover, health systems type are not correlated with the likelihood to enter in periods of consolidations once we control for the state of the economy.

Discussion and Conclusion

Our results, robust to different model specifications, allow us to reject the null of hypotheses 1a and 1b. Fiscal consolidations are associated with lower preventive care investments in an absolute

and relative sense. As a public good whose benefit unfolds in the long term, preventive care is not salient in the public debate: neither the public nor interest groups are mobilized to protect preventive care investments from austerity measures. This contrast with the resilience to austerity of curative care relative to preventive care. Curative care is a salient and popular policy providing insurance in the short term against risks shared by most citizens. Interestingly, austerity is the only variable significantly correlated with preventive care in all our models. In our view, public health scholars must incorporate considerations related to the political economy of public finance to understand variations in investments in preventive care. This is the main contribution of this article.

Another political consequence of the nature of preventive care is that government partisanship does not influence the level and ratio of investments in public health. Hence, even if one might expect that left-wing parties prefer more investments in preventive care, the priorities of voters and of interest groups are focused on other policies; both the left and the right are as unlikely to increase preventive care spending. As such, we can reject the null of hypothesis 2. Finding a null effect of government partisanship on preventive care investments is the second main contribution of this study.

The third contribution of this article is to compare the level of preventive care investment in different health care systems. Our models reveal that NHS systems maintain higher investments in preventive care than SHI systems, allowing us to reject the null of hypothesis 3. However, we were not fully able to test the mechanisms underlying hypothesis 4. It is possible that SHI systems indirectly favor preventive care if they incentivize parties to increase health care contributions rather than reducing spending to face fiscal pressures (Truchlewski, 2020). We could not completely rule out this effect by controlling for fiscal consolidations in our models. Additional in-depth studies comparing how different health care systems influence policy-makers' incentives to invest in preventive care are still needed.

It is worth acknowledging the limitations of our dataset. The time series remains short in most countries. Although we relied on the best available dataset, preventive care remains difficult to measure and there may be cross-country discrepancies in data collection. At least, the fixed effects regressions allowed us to model within-country changes, which parsed out between-country variations in the measurement of preventive care. Our results are also robust to using the other main dataset of preventive care investments. Still, further research should compare the determinants of public health investments in different jurisdictions within the same country, assuming that a national agency can generate data that would be more comparable than cross-national data (but see Ammi et al., 2021 about the difficulty to measure preventive care even among Canadian provinces).

It is possible that the quiet politics of preventive care becomes louder and more salient in the years following the COVID-19 crisis. For a short period of time, preventive care may become a valence issue, as most mainstream parties may propose higher investment to avoid the mistakes that led to the proliferation of the disease. This may open a window of opportunity to substantially invest in long-term preventive care investments, if government do not implement austerity measures to reduce their deficits induced by the crisis.

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