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Andrea M. Leiter, Engelbert Theurl

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Contact address of the editor:
research platform "Empirical and Experimental Economics"
University of Innsbruck
Universitaetsstrasse 15
A-6020 Innsbruck
Austria
Tel: + 43 512 507 71022
Fax: + 43 512 507 2970
E-mail: eeecon@uibk.ac.at

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DETERMINANTS OF PREPAID SYSTEMS OF HEALTHCARE FINANCING – A WORLDWIDE COUNTRY-LEVEL PERSPECTIVE

Andrea M. Leiter* and Engelbert Theurl**

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Abstract

In this paper we examine determinants of prepaid modes of health care financing in a worldwide cross-country perspective. We use three different indicators to capture the role of prepaid modes in health care financing: (i) the share of total prepaid financing as percent of total current health expenditures, (ii) the share of voluntary prepaid financing as percent of total prepaid financing, and (iii) the share of compulsory health insurance as percent of total compulsory financing arrangements. We refer to a panel data set comprising 158 countries and covering the time period 2000-2015. We apply a static as well as a dynamic panel data model.

We find that the current structure of prepaid financing is significantly determined by its different forms in the past. The significant influence of governmental revenues, development assistance for health and regulatory quality varies depending on the financing structure we look at. The country's GDP per capita, the agricultural value added, the degree of urbanization and the share of the elderly are only of minor importance for explaining the variation in a country's structure of health care financing.

From our analysis we conclude that more detailed information on indicators which reflect the distribution of individual characteristics (such as income and health risks) within a country's population would be needed to gain deeper insight into the decisive determinants for prepaid health care financing.

Keywords: Health care financing, prepaid health care financing systems, out-of-pocket payments, panel data analysis

JEL Classification: I13, I14, H51, C33

* Corresponding author. Faculty of Economics and Statistics, University of Innsbruck, Universitaetsstrasse 15, 6020 Innsbruck, Austria. E-mail: andrea.leiter@uibk.ac.at.

** Faculty of Economics and Statistics, University of Innsbruck, Austria.

1. Introduction

“Money is the mother’s milk of health care. However, money does not automatically produce efficient, equitable, and effective health care. (...) The financing method chosen is of critical importance because it determines the risk-pooling arrangement and the distribution of the cost burden. It also places the financial decision-making power in the hands of a particular organization, which will decide resource allocation and distribution of services and will choose a payment method to provide incentives to providers.” (Hsiao, 2007, 950). With this statement Hsiao starts his plea for a broader and more systematic view of health care financing. He argues that financing is not only an instrument to raise resources for the production of health care services. Different modes of health care financing need specific forms of organizing the financing process (including collecting, pooling, purchasing) and offer diverse incentives for an effective, efficient and equitable coverage of health care risks, health care provision and health care utilization.

The role of prepaid health care financing in form of governmental revenues , compulsory health insurance contributions or private health insurance premiums compared to individual out of pocket payments in the case of health care service utilization is a crucial trade-off in this respect. Individually, poor health and as a consequence health expenditure are to a large extent unpredictable and reduce the possibilities to consume other necessities and amenities of life. If individuals are risk averse, they demand prepaid health care financing schemes with their risk-pooling characteristics to smooth their consumption paths. Consequently, the implementation of prepaid systems of health care financing seems to have high potential for a Pareto improvement. This is especially true if direct payments are substantial and/or push the individual below the poverty line. In addition, it is well known that major reliance on direct payments by the patient is likely to have a regressive impact on personal income distribution (Wagstaff & Van Doorslaer

2000; Sanwald & Theurl 2015). Finally, out-of-pocket payments act as a barrier for healthcare utilization and might have negative effects on long-term health status, especially for low-income individuals (Kiil & Houlberg 2014). At the same time, if transaction costs of prepaid systems to safeguard insurance efficiency are substantial, cost sharing can improve social welfare.

It is therefore not surprising that the role of prepayment is of high relevance in health care reform initiatives in many countries, especially within the broader concept of universal health care coverage initiated by the WHO (WHO 2017). But effective strategies to implement and disseminate prepayment have to be based on systematic empirical knowledge about the determinants of health care financing. In this paper we study economic, socio-demographic, political and institutional covariates of prepaid modes of health care financing in a worldwide country perspective. We refer to a panel data set comprising 158 countries covering the time period 2000 – 2015. We use three different indicators to capture the prepaid modes of health care financing: (i) the share of prepaid financing as percent of total current health care expenditure, (ii) the share of voluntary prepaid financing as percent of total prepaid financing, and (iii) the share of compulsory health insurance as percent of total compulsory financing arrangements. Aside using a static model we allow for a dynamic adjustment of the dependent variable and estimate a dynamic panel model including fixed effects and controlling for endogeneity and autocorrelation of some regressors.

For a comprehensive overview of the older literature on the determinants of health care expenditures and financing see Gerdtham & Jönsson (2000). This paper contributes in several ways to the *recent* literature on the determinants of health care financing. First, instead of focusing on monetary values of health care financing (Xu et al. 2011) or out-of-pocket shares (Fan & Savedoff 2014) this paper aims at providing deeper insights into financing structures rather than financing levels. Second, our analysis complements the available case studies on prepaid health care financing for selected countries (Ataguba et al. 2018; Barasa et al. 2017; Lagomarsino 2012;

McIntyre et al. 2018) by providing a global perspective on financing structures. Third, our analysis is based on most recent data on health care financing following the Global Health Expenditure Database of the WHO which is based on the System of Health Accounts 2011. The database covers the years 2000 to 2015 and provides information on health care financing from 188 countries. Fourth, the set of explanatory variables in this study comprises economic, socio-demographic, political and institutional factors and thereby extends the set of variables used in previous analysis substantially. Methodologically, as we use relative measures for describing the structure of health care financing we calculate the log-odds-ratios for the dependent variables before applying a standard fixed effects model and a dynamic fixed effects model.

Our results show that the structure of health care financing in previous years significantly determines its current structure. In addition, we find that the share of prepaid financing significantly increases while the share of voluntary prepaid financing significantly decreases with increasing governmental revenues. Development assistance for health shows a significantly positive impact on the share of voluntary prepaid financing and a significantly negative influence on the probability of coexisting voluntary and compulsory health insurance. Regulatory quality significantly reduces the share of voluntary prepaid financing as well as the probability that voluntary health insurance and compulsory health insurance coexist.

The countries' GDP per capita, the agricultural value added, the degree of urbanization, and the share of the elderly are of minor importance for explaining their health care financing structure. The labor participation rate, mean years of schooling, and the role of democracy in the past are in none of the specifications a significant determinant of the health care financing structure.

The remainder of the paper is organized as follows. In Section 2, we present some stylized facts which provide first insights into the structure, importance and temporal development of prepaid health care financing. In Section 3, we describe the data sources as well as the dependent and

explanatory variables. Section 4 outlines our estimation strategy and Section 5 presents results and a discussion. Finally, Section 6 concludes.

2. Stylized facts

To motivate our approach we start with a few stylized facts on worldwide health care financing. Empirical evidence shows a substantial increase in the level of health care financing per capita (Fan & Savedoff 2014). To picture the structure of health care financing we separate four types of health care financing, namely (i) health care financed by the state government, (ii) health care financed by compulsory health insurance, (iii) voluntary prepaid schemes and (iv) out-of-pocket health care payments.

On a worldwide cross-country average, 39.8% of the current total health expenditures are government financed, 15.2% are financed by compulsory health insurance, 9.8% are financed by voluntary prepaid schemes (adding up to 64.8 % of total prepaid) and 35.0 % out of pocket. This summarizes to a compulsory financing of 55 % and a voluntary financing of 44.8 %. This calculation is based on the information given in the raw data. Obviously, the aggregation of compulsory prepaid financing, voluntary prepaid financing and OOP does not add up to 100 %. However, for the majority of the countries (83%) the aggregated values range between 99% and 101%. Over time, the cross country average of government-financed health care amounted to 39.7 % in 2000, peaked at 40.5 % in 2009 and decreased to 40.4% in 2009. The average initial share of compulsory health insurance was 14.2 % in 2000 which increased to 16 % in 2015. Its highest share with 16.1 % was observable in 2013. Voluntary prepaid financing increased from 9.3 % in 2000 to 9.9 % in 2015 with a peak at 10.3 % in 2005. Finally, the average OOP financing almost monotonically decreased from 37.8 in 2002 to 32.9 % in 2015. The aggregate of total prepaid

financing increased within 16 years by 3 percentage points, namely from 63.3 % in 2000 to 66.3% in 2015.

Figure 1 pictures the structure of health care financing. All indicators are measured as percent of total current expenditures on health and are averaged over the five most recent years available (2011-2015). Government financing and compulsory health insurance refer to compulsory forms of financing (starting in the bottom left corner of figure 1) while voluntary prepaid financing and out-of-pocket expenditures inform about the role of voluntary financing (starting in the top right corner of figure 1). The size of the circles refers to the countries' population.

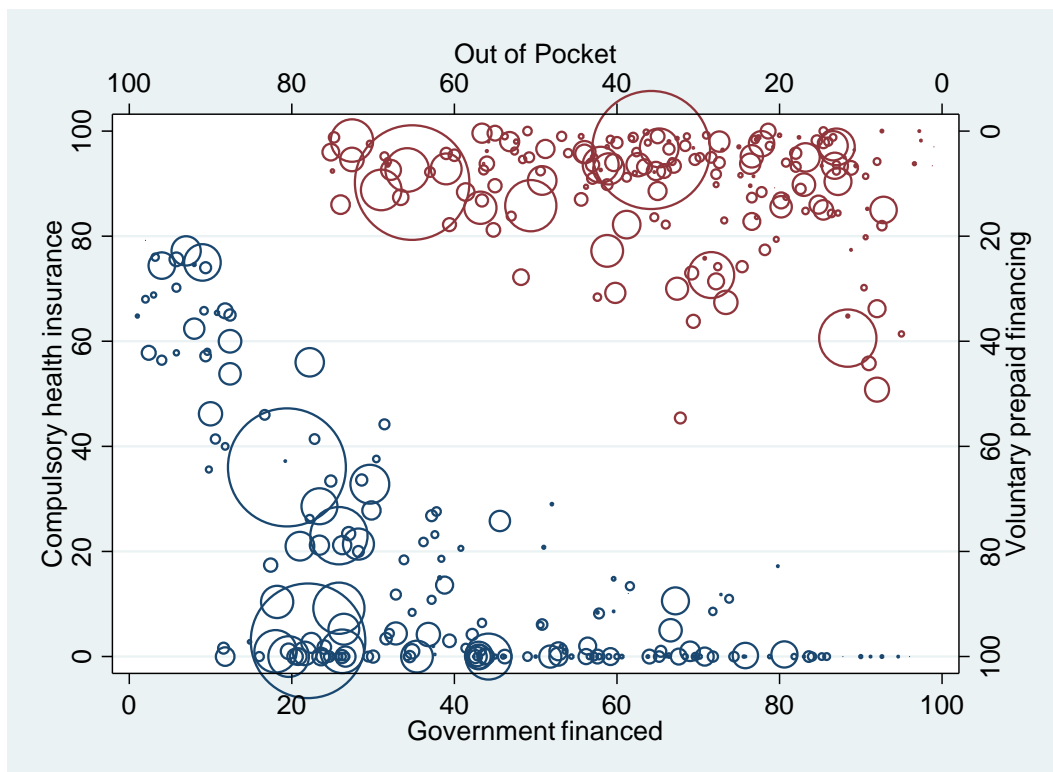


Figure 1: Types of health care financing as % of total current health care expenditures

Figure 1 reveals that there is a huge heterogeneity in the financing structure in a worldwide perspective.

Compulsory health insurance of the three largest countries, China, India and the USA, amounts to 36.0%, 3.0%, and 23.0%, respectively. Their government-financed health care account for 19.4%, 22.0% and 25.8%. With respect to the voluntary financed health care, the two Asian countries show low proportions of voluntary prepaid schemes (China: 3.6%, India: 9.8%) while in the USA 39.4% of current health expenditures are covered by such - in the case of the US mainly firm based - schemes. Reversely, out-of-pocket-expenditures are in the USA with 11.6% relatively low compared to China (35.8%) and India (65.2%).

Figure 1 further highlights that although compulsory health insurance is zero or close to zero in several countries, the overall share of expenditures covered by public funds is at least around 12%. In particular, in 114 out of 188 countries either the share of compulsory health insurance or the share of government-financed health services is below 5% but even in these countries the overall share of compulsory financed health care ranges between 11.8% (Afghanistan) and 96.0% (Tuvalu). With respect to the voluntary prepaid schemes the figure shows that voluntary prepaid financing ranges between 0 and 55%. For 67 out of 188 countries, expenditures covered by voluntary prepaid schemes are below 5%. In contrast, the variation in the out-of-pocket expenditures is more pronounced. Finally, Figure 1 also pictures that the variation in out-of-pocket expenditures arises from the heterogeneity in publicly financed health care rather than from variations in private prepaid schemes.

Figure 2 draws the concentration curve of total prepaid health care financing on the y-axis against the countries' population share on the x-axis. The remaining source of health care financing, out-of-pocket payments, is defined as the difference between 100% and the share of the total prepaid plans. Countries are ordered on the x-axis by their share of total prepaid financing in ascending order. We plot the average share of prepaid financing in the starting period of our sample including

data from 2000 – 2004 and in the last period including data from 2011 – 2015. The size of the countries can be derived from the lines' horizontal length.

Rather than focusing on the states but considering their population shares, this form of presentation allows population weighted statements on the role of total prepaid financing. In the most recent period, the worldwide median individual (from China) faces a share of total prepaid financing of 59 %. For 62 % of the world population the share of prepaid schemes is 50 % or higher. Comparing the two time periods we can conclude that the majority of countries experience an increase in the share of prepaid plans and, consequently, a decrease in out-of-pocket payments over time. From a worldwide - population oriented - perspective the increase in China and India are especially remarkable (increase of prepaid share from 27.4% to 34.8% in India and 36.4% to 59% in China). A closer look at the changes also reveals a development of convergence of prepaid financing at a higher level.

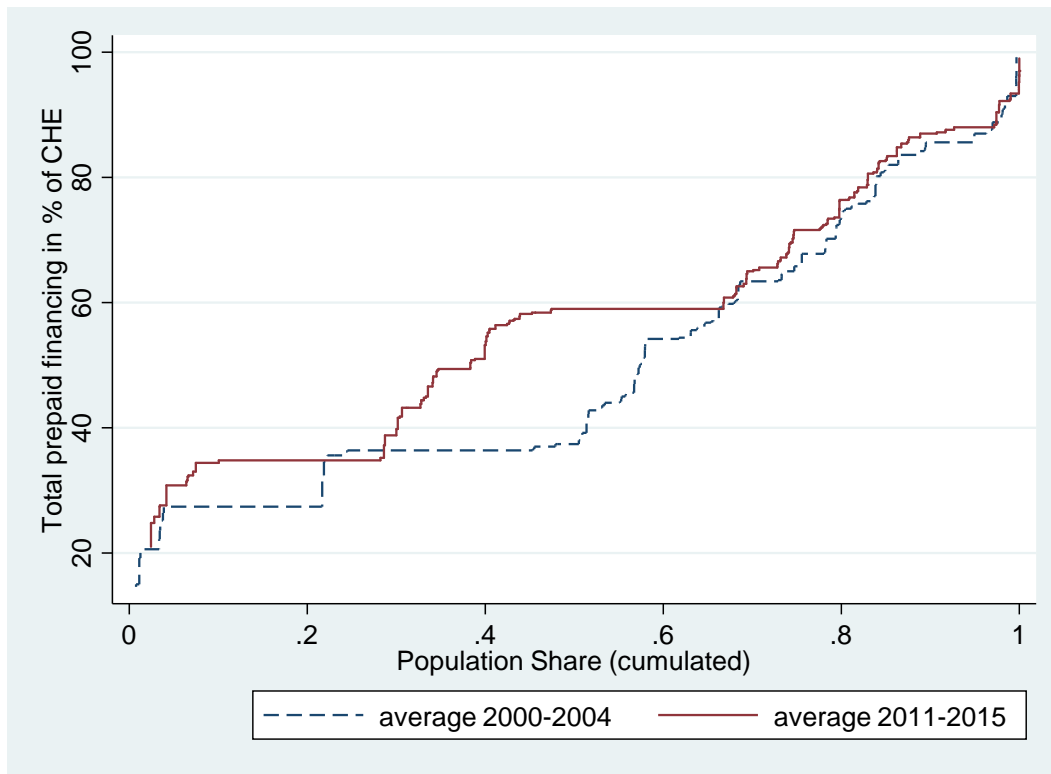


Figure 2: Concentration curve of worldwide prepaid health care financing

3. Data

3.1 Dependent Variables

In the following we specify the indicators of prepaid financing in detail. Our exclusive data source for the role of prepaid health care financing is the Global Health Expenditure Database (GHED) of the WHO. The framework of this data base uses the System of Health Accounts (SHA) 2011. Data in the SHA 2011 specification are only available since the year 2000, so we take 2000 – 2015 as our sample period. The GHED provides two types of indicators, which inform on the role of prepaid health care financing: indicators of sources of funds and indicators that describe financing arrangements. We use the second classification with minor modifications. To examine the role of prepaid health care financing we define three dependent variables:

1. total prepaid financing as percent of total current health expenditures (*pre_che*),
2. voluntary prepaid financing as percent of total prepaid financing (*vol_pre*) and
3. compulsory health insurance as percent of compulsory prepaid financing (*hi_com*).

Total prepaid financing as percent of current health expenditures (*pre_che*)

The first indicator *pre_che* measures the relative importance of total prepaid health care financing compared to out of pocket (OOP) payments. We already justified the choice of this variable by pointing to the important consequences of the trade-off between direct payments and prepaid financing for the organization of the health care financing process, for social welfare, equity and efficiency of health care financing and health care utilization. We use total current health expenditures as denominator. Total current health expenditure refers to all health goods and services used during a year to produce health care. The more volatile and future oriented category gross capital formation in the health care sector (investments in building & machinery & IT) is

excluded. The numerator total prepaid financing refers to the GHED's "financing arrangements" and includes: (i) prepaid arrangements financed by the government, (ii) prepaid arrangements financed by compulsory health insurance (this includes social health insurance and other compulsory (private) health insurance schemes), (iii) voluntary prepaid arrangements financed by voluntary health insurance and other voluntary institutions (e. g. non-profit institutions serving households, enterprise based financing schemes).

Voluntary prepaid financing as percent of total prepaid financing (vol_pre)

The three prepaid financing mechanisms have in common that they separate the utilization of health care services from its financing and therefore include risk pooling effects. However, character and size of the pooling effects differ widely between and also within the three financing modes. A risk pool might be unitary, fragmented or integrated. Government financed risk pools might differ by their size, by the sort of taxes used for financing, by the role of external financing through intergovernmental fiscal relations, by the entitlements granted to the risk pool members, a.s.o. We capture one important facet of this heterogeneity of prepaid financing by our second dependent variable (*vol_pre*): It distinguishes between voluntary and compulsory prepaid financing. The two forms of prepaid financing differ widely in their scope of risk pooling. Risk pools financed by private health insurance are not homogenous. They differ in their reliance on experience rating and consequently in their character and amount of intertemporal and interpersonal risk pooling. But basically voluntary prepaid financing is based on the equivalence of health expenditure risk and individual contribution and therefore includes only a narrow form of risk pooling. Compulsory forms of prepaid financing cut this equivalence. This allows an extension of the intertemporal and interpersonal risk pooling and also includes elements of income redistribution (Sinn 1995).

In addition, risk pools based on compulsory arrangements face different advantages and challenges (e.g. transaction costs, problem of adverse selection and cream skimming, possible forms of pooling) compared to risk pools based on voluntary arrangements.

In the variable *vol_pre*, voluntary prepaid financing forms the numerator of the dependent variable. The denominator consists of total prepaid arrangements. In this context we prefer the separation by the criteria voluntary vs. compulsory over the criteria private vs. public, because the former is more important for the organization and effects of risk pooling.

Compulsory health insurance as percent of compulsory financing arrangements (hi_com)

The third indicator (*hi_com*) informs on the structure of compulsory prepaid financing. It refers to the ratio between compulsory health insurance and government based health care financing. The empirical literature reveals substantial differences between government- and social health insurance-financed health care systems (Wagstaff 2010). They differ in the criteria of eligibility in the risk pool, in the financing instruments, in the administrative costs of health care financing, in the relationship to the health care providers and in the integration in the political system, with important consequences to efficiency and equity in health care financing and utilization and for the whole economy (e.g. labor market).

3.2 Explanatory Variables

Theoretical insights and previous literature motivates the inclusion of various independent variables to explain the variation in the structure of health care financing. In the following, we discuss the expected influence of each explanatory variable on the three dependent variables *pre_che*, *vol_pre*, *hi_com* and present their data sources (see Table A1 in the Appendix for the data sources used).

GDP/capita

Information on the constant (2005 USD) GDP per capita (*gdppc_cons*) are taken from the World Bank's World Development Indicators (WDI). We include the one year lag of GDP/capita in logs as explanatory variable as the contemporaneous variable might be endogenous with our dependent variables. The influence of the GDP/capita on *pre_che* depends on how risk preferences vary with changes in GDP/capita. As Cebula (2006) and others we assume that health insurance is a normal good. Hence, we expect an increase in the health insurance level with rising income. However, how increasing income affects the relative importance of prepaid financing in total current health expenditure and, hence, the share of prepaid financing is ambiguous. With respect to *vol_pre* we expect a positive impact of GDP/capita on voluntary prepaid financing. This is because preferences for product diversification, i.e., a variation in insurance packages, increase with income.

With respect to the *hi_com* there exist arguments for a positive as well as a negative impact of GDP/capita on the share of compulsory health insurance relative to compulsory prepaid financing. A negative relation between GDP/capita and *hi_com* is expected as tax-financed health care systems are characterized by a progressive tariff structure: If income rises, revenues rise disproportionately. By contrast, social health insurance systems generally have a proportional or regressive tariff structure. I.e., if income rises, revenues rise proportionally at most. Following this argumentation, it is expected that income will have a negative impact on the share of compulsory health insurance whereas the importance of tax-financed health systems increases. A positive influence of GDP/capita, on the other hand, is supported by the fact that insurance-based systems try to reflect the individual preferences better than tax-financed systems, even when insurance-based systems are subject to compulsory insurance. Accordingly, the share of insurance-based systems should increase with increasing income.

Government revenue

Data on the general government revenue (*govrev*) is provided by the IMF, World Economic Outlook Database. We include the one year lag of government revenues (measured in % of GDP) as explanatory variable in order to reduce the potential endogeneity of *govrev*. Government revenue is seen as a proxy of the states' financing potential and tax efforts (Gupta 2007). If the public financing potential is high, the possibility of (public) prepaid financing increases. Therefore we expect a positive influence of governmental revenues on *pre_che* and a negative impact on *vol_pre*. Since government revenues comprise taxes and contributions to social health insurance the effect of this variable on *hi_com* is ambiguous.

Labor participation rate

Data on the labor force participation rate (*lpr*) is available from the World Bank's WDI. Similar to the GDP/capita, we include for endogeneity reasons the one year lag of the labor participation rate. The labor participation rate is expected to positively influence *pre_che* for several reasons. (i) An important precondition for prepaid financing is formal monetized income which arises from the individuals' participation in the official labor market. (ii) The organization of prepaid financing systems often anchors at the existence of a workplace. Historically, this is particularly true for the traditional social health insurance systems in Europe. (iii) The higher the labor participation rate, the lower the shadow economy and the higher the coverage provided by prepaid financing systems. Each of these three statements applies to total prepaid financing in general but particularly holds for compulsory prepaid systems so that the influence of the labor participation rate on *vol_pre* is expected to be negative. The positive influence of the labor participation rate on *hi_com* can be justified as follows: The financing of compulsory health insurance systems highly depends on the

performance of the labor market (i.e., wage levels, number of employees). Taxation on the other hand uses a broader contribution base and includes not only labor income but also capital income, consumption and wealth. Therefore, an increase in the labor force participation rate leads to an increase in the share of compulsory health insurance.

Agricultural value added

For the variable agricultural value added, which we took from the World Bank's WDI, we expect a negative impact on *pre_che*. This can be explained by a characteristic of the agricultural sector, namely that production and consumption are not spatially separated (family-run farms). This firm structure enables informal forms of health risk coverage via family members (Dercon 2002; Gertler & Gruber 2002). The higher the proportion of informal coverage the lower is the demand for formal prepaid coverage. Furthermore, workers in agricultural firms receive a substantial part of their income as payment in kind (i.e., in form of natural produce). Payments in kind only have implicit prices and are therefore a poor contribution base, especially for compulsory prepaid systems. The above arguments also apply for *vol_pre* (i.e. the comparison of voluntary prepaid vs. compulsory prepaid) which let expect a positive influence of the agricultural sectors' size on *vol_pre*. Finally, the expected influence of agricultural value added on *hi_com* is ambiguous.

Development assistance for health (DAH) per capita

Information on development assistance for health, measured in constant 2014 USD, is provided by the Institute for Health Metrics and Evaluation (IHME 2017). We divide this variable by the countries' population (taken from the WDI) to achieve the development assistance for health per capita (*dah_cap*).

DAH will, with a few exceptions, flow into the prepaid sector and will be used to finance public projects. DAH is therefore expected to have a positive influence on *pre_che* and a negative impact on *vol_pre*. With regard to *hi_com*, the expected sign of DAH is negative. States are interested in using DAH to increase their state budget and thus gain political benefits. I.e., DAH will flow into health projects initiated by the government rather than initiated by compulsory health insurance. One exception is projects, especially in countries with precarious political conditions, which are aimed at strengthening citizens' rights (strengthening social rights; contractual security, social security). In such countries systems autonomous from the state are more likely to strengthen civil rights and to receive international financial support.

Urban population

Data on the urban population (*popurb*) are taken from the World Bank's WDI series. A high proportion of the population in urban areas should influence *pre_che* and *vol_pre* positively. This can be explained by lower transaction costs and the presence of peer effects in agglomerations so that the development and organization of compulsory and voluntary prepaid systems in urban areas works better compared to rural regions. The same argument let expect a positive influence of urbanization on *hi_com*: Transaction costs are higher for compulsory health insurance than tax financed health coverage so that compulsory health insurance benefits more from urbanization than tax financed systems.

Share of population aged 65+

The share of population older than 64 years (*pop65+*) is again taken from the World Bank's WDI. Two arguments can be brought forward which let assume a positive influence of the population share of the 65+ on *pre_che*. (i) As the proportion of people over 64 years of age increases, there

is political pressure to expand prepaid systems (especially compulsory prepaid systems), because the elderly benefit from redistribution within prepaid systems. (ii) The savings of older people are built up via prepaid systems. The larger the proportion of the population over 64, the higher is on average explicit (houses, private insurance) and implicit (insurance claims) wealth. From argument (i) it further follows, that a large share of elderly will negatively influence *vol_pre*. The influence of the elderly on *hi_com* is ambiguous.

Education

Education is captured via the average years of schooling (*myschool*) reported in the UNs Human Development Reports. Education, measured as mean years of schooling, is expected to positively influence *pre_che* for the following reasons. (i) Education increases individual risk aversion so that educated people have a higher demand for protection. (ii) Educated are more patient and are willing to delay gratification; their rate of time discounting is lower which results in a higher demand for future coverage. (iii) Education increases understanding of the functioning and usefulness of prepaid systems. Argument (iii) also justifies a positive influence of education on *vol_pre*. Since the cognitive challenges in voluntary prepaid schemes are higher compared to compulsory financing systems, voluntary prepaid systems have significantly higher transaction costs than compulsory prepaid systems. Education lowers these transaction costs. Information costs are also larger in social health insurance systems than in tax-financed systems so that education is expected to also positively influence the share of compulsory health insurance over tax-financed coverage, *hi_com*.

Percentage of democratic years (1980-2015)

An indicator (*polity2*) of the countries policy regime is taken from the Polity IV project, Political Regime Characteristics and Transitions, 1800-2013. We use this information to calculate the fraction of democratic years (*democperm*) since 1980 up to year *t* according to Besley & Kudamatsu (2006).

(Public) prepaid systems involve redistribution (risk redistribution, income redistribution) the majority of the population benefits from. In autocratic systems, maintaining political power has priority. Political power is achieved by rewarding system-relevant target groups (civil servants, the military, the rich, etc.) so that these groups have a low interest in a general redistribution (Besley & Kudamatsu 2006). In democratic systems, on the other hand, the opinion of the median voter is decisive. *Pre_che* is therefore expected to be the higher the more years (measured from 1980-2015) a state has a democratic government. Olsen (1982) provides another argument for a positive influence of democratic systems on prepaid systems: The expansion and development of prepaid systems takes time. The longer a democratic government is in office, the more pronounced prepaid financing systems will be. The argumentation for a negative influence of democracies on *vol_pre* (and therefore in favor of compulsory prepaid) is similar to that for *pre_che*. In addition, voluntary prepaid systems include only protection against cost of illness but no redistribution of income, whereas compulsory systems that were financed on an income-oriented basis also offer protection against income fluctuations (= redistribution of income). Hence, the median voter will opt for compulsory prepaid financing.

Two arguments suggest a negative influence of the proportion of years a democratic government is in office on *hi_com*. (i) In autocratic systems, compulsory health insurance is an instrument of the ruling group to make systematically important population strata (civil servants, military) immune against social revolutions (Besley & Kudamatsu 2006). (ii) Social security systems are

particularistic and characterized by regressive or proportional tariffs, whereas tax-financed systems are unitary and tariffs are mostly progressive. The median voter would prefer c.p. tax-financed systems with more egalitarian coverage.

Regulatory quality

An index (*regqual*) reflecting the countries' regulatory quality is provided by the Worldbank's Worldwide Governance Indicators (WGI) Project. According to the WGI's definition regulatory quality “*captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.*” Hence, regulatory quality refers to the perceived efficiency of the government which influences para-fiscal institutions as well as private companies through legislation. Regulatory quality is expected to positively influence prepaid systems. Such systems are future-oriented and binding. They therefore require trust in contractual stability. High quality governmental regulations are an essential basis for this trust. The higher the quality of regulation, the higher the confidence in and demand for prepaid financing schemes and, following, the higher will be *pre_che*. For *vol_pre* and *hi_com* the effect of regulatory quality is ambiguous.

4. Estimation strategy

4.1 Empirical Model and Estimation

Since the three dependent variables *pre_che*, *vol_pre* and *hi_com* are shares, we first calculate the log-odds-ratio for the dependent variables and apply a standard fixed effects model on the linearized dependent variables. Our main specification reads as

$$\ln\left(\frac{y_{it}}{1-y_{it}}\right) = \beta_0 + \beta_1 \mathbf{econ}_{it} + \beta_2 \mathbf{demo}_{it} + \beta_3 \mathbf{pol}_{it} + \delta_t + \theta_i + \varepsilon_{it} \quad (1)$$

with y_{it} representing the share of total prepaid financing as percent of current health expenditures (*pre_che*), the share of voluntary prepaid financing as percent of total prepaid financing (*vol_pre*) or the share of compulsory health insurance as percent of compulsory financing arrangements (*hi_com*). i stands for country and t indicates the year of observation. The vector ***econ*** comprises the log-transformed GDP per capita in constant 2005 US\$ (*lngdppc_cons*), the general government revenue as % of GDP (*govrev*), the labor force participation rate (*lpr*), the agricultural value added as percent of GDP (*va_agri*) and the countries' per capita development assistance for health (*dah_cap*). The vector ***demo*** includes the proportion of urban population (*popurb*), the proportion of people aged 65 or above (*pop65+*) and mean years of schooling (*myschool*). The vector ***pol*** collects information on the percentage of democratic years from 1980-2013 (*democperm*) and an index for regulatory quality (*regqual*). δ_t represents time-period dummies and controls for time specific influences that apply to all countries and the set of country-dummies θ_i controls for influences which are fixed across countries. Finally, ε_{it} represents the remainder error. To ensure exogeneity of specific explanatory variables with respect to the error term we include one-year lags of *lngdppc*, *govrev*, and *lpr*.

In addition to the static fixed effects model we estimate a dynamic fixed effects model developed by Hsiao, Pesaran & Tahmiscioglu (2002). Kripfganz (2016) describes the Stata command *xtpdqml* which allows for an easy implementation of this quasi-maximum likelihood (QML) estimation for linear panel data models. Compared to the system-GMM-estimator used in Xu et al. (2011) which instruments the endogenous lagged dependent variable by its lags, Kripfganz's routine models initial observations of the dependent variable as a function of observed variables.

Including the lagged dependent variable, the specification for the linear panel data model is

$$\ln\left(\frac{y_{it}}{1-y_{it}}\right) = \gamma_0 + \lambda\left(\frac{y_{it-1}}{1-y_{it-1}}\right) + \gamma_1 \mathbf{econ}_{it} + \gamma_2 \mathbf{demo}_{it} + \gamma_3 \mathbf{pol}_{it} + \eta_t + \phi_i + \nu_{it}. \quad (2)$$

Using Kripfganz's stata routine *xtdpdqml*, the actual estimation of equation (2) is performed on its first-differences which removes the time invariant parameters ϕ_i . η_t denotes time fixed effects and v_{it} stands for the error term.

The log-odds ratio of a variable is missing, whenever the numerator of the dependent variable is zero. These observations are therefore not included in the analysis which uses the log-odds ratio as the dependent variables. This is a relevant problem for *vol_pre* and *hi_com* as some countries either offer no voluntary prepaid financing (*vol_pre*=0) or no compulsory health insurance (*hi_com*=0). We therefore additionally apply a probit model in order to examine whether countries systematically select into offering no voluntary prepaid schemes (N=95) or no compulsory health insurance (N=935). We thereby apply a selection equation as proposed by Semykina & Wooldridge (2010). The specification reads as:

$$s_{it} = 1[\alpha_0 + \alpha_1 \mathbf{econ}_{it} + \alpha_2 \mathbf{demo}_{it} + \alpha_3 \mathbf{pol}_{it} + \kappa_t + \xi \bar{\theta}_i + v_{it} > 0] \quad (3)$$

The dummy variable s_{it} either indicates (i) whether a country does have voluntary prepaid financing in addition to compulsory financing arrangements or (ii) whether compulsory health insurance and governmental financing arrangements coexist, and is zero otherwise. $\bar{\theta}_i$ denotes country specific averages of all explanatory variables (Mundlak terms). The Mundlak terms are equivalent to country fixed effects as they capture time invariant country specific determinants. κ_t and v_{it} describe the time fixed effects and the error term, respectively.

5. Results

5.1 Descriptive Statistics

The empirical analysis is based on a data set including 2,343 observations of 158 countries and 16 years (2000-2015). Table A2 in the Appendix summarizes the descriptive statistics of the dependent variables as well as explanatory variables used in the subsequent empirical analysis.

5.2 Determinants of total prepaid financing as percent of current health expenditures

Table 1, columns (1) and (2), present the results for the role of prepaid financing, i.e., the share of total prepaid financing as percent of current health expenditures. The significantly positive coefficient of governmental revenues, which serves a proxy for the countries' financing potential (Gupta 2007) meets the expectations: The higher the scope for public financing the higher is the share of total prepaid financing. When we allow for a dynamic adjustment of the dependent variable and estimate a dynamic panel model governmental revenues still turn out as a significant determinant of prepaid health care financing. As expected, also the level of prepaid health care financing last year decisively influences today's share. The influence of the remaining explanatory variables cannot be precisely estimated.

Table 1: Fixed effects estimation for total prepaid financing, voluntary prepaid financing and compulsory health insurance

Dep. Variable Model	<i>pre_che</i>		<i>vol_pre</i>		<i>hi_com</i>	
	static (1)	dynamic (2)	static (3)	dynamic (4)	static (5)	dynamic (6)
L.pre_che_lo		0.801*** (0.057)				
L.vol_pre_lo				0.814*** (0.038)		
L.hi_com_lo						0.696*** (0.075)
L.lngdpp_cons	-0.156 (0.133)	-0.019 (0.044)	-0.231 (0.271)	-0.104* (0.058)	0.769*** (0.282)	0.138 (0.128)
L.govrev	0.017*** (0.004)	0.003** (0.001)	-0.013** (0.005)	-0.006*** (0.002)	-0.003 (0.006)	-0.002 (0.003)
L.lpr	-0.001 (0.009)	0.001 (0.002)	0.016 (0.023)	0.005 (0.007)	-0.016 (0.020)	-0.005 (0.007)
va_agri	0.005 (0.005)	0.000 (0.002)	0.010 (0.009)	0.004 (0.002)	0.017 (0.011)	0.008* (0.005)
dah_cap	0.001 (0.003)	-0.001 (0.001)	0.007*** (0.003)	0.002* (0.001)	-0.002 (0.006)	-0.002 (0.003)
popurb	0.018 (0.013)	0.006 (0.003)	-0.036** (0.017)	-0.003 (0.005)	0.028 (0.025)	0.011 (0.009)
pop65	-0.014 (0.021)	-0.003 (0.007)	-0.079* (0.048)	-0.012 (0.013)	-0.005 (0.054)	-0.018 (0.020)
myschool	0.046 (0.053)	0.017 (0.011)	0.007 (0.064)	-0.008 (0.017)	0.033 (0.071)	0.000 (0.024)
democperm	0.020 (0.149)	0.045 (0.071)	-0.122 (0.215)	-0.078 (0.055)	0.260 (0.191)	-0.006 (0.078)
regqual	0.045 (0.086)	0.003 (0.035)	-0.296** (0.121)	-0.068* (0.037)	-0.291* (0.151)	-0.034 (0.064)
Obs	2343	2171	2248	2054	1406	1199

Notes: Constant, time and country fixed effects not reported. Robust standard errors in parentheses. *, **, *** indicate 10%, 5% and 1% levels of significance.

5.3 Determinants of voluntary prepaid financing as percent of total prepaid financing

The analysis of the second dependent variable gives insights into the structure of total prepaid financing. The majority of prepaid financing is compulsory while voluntary prepaid financing plays a minor role. In fact, for 95 observations out of 2343 voluntary prepaid financing is zero. After presenting the results for the intensive margin (Table 1, columns (3) and (4)) we therefore also provide evidence on the extensive margin by examining the probability of the coexistence of compulsory *and* voluntary prepaid financing (Table 2, column (1)).

As outlined in Section 3.2., governmental revenues picture the financial scope of governments to finance health care. Hence, we expect that in countries with higher governmental revenues compulsory prepaid financing is more important than voluntary financing. For the sample with positive shares for compulsory *and* voluntary prepaid financing we find support of this hypothesis: Voluntary prepaid financing and, hence *vol_pre*, is the lower the higher the higher governmental revenues are.

The significantly positive coefficient on development assistance for health indicates that this type of funds particularly supports voluntary health insurance systems. This positive impact does not meet our primary expectations, namely, that DAH will be mainly used to finance public projects.

A possible explanation for this unexpected relationship can be derived from the data. In about 60 % of the countries that received DAH, autocratic governments have been prevalent in the past 25 years. As already argued in Section 3.2., DAH in such countries is likely to aim at strengthening citizens' rights by supporting voluntary, and likely non-governmental, financing arrangements.

The argument of easier access to and lower transaction costs for prepaid financing in urban regions should be particular valid for voluntary risk pools. Following, voluntary risk pooling should be

easier in urban regions. The significantly negative impact of the urban population on voluntary prepaid financing in the static model does not meet this expectation.

The significantly negative influence of the elderly on the share of voluntary prepaid financing is in line with the argument that an aging population increases the political pressure to expand compulsory prepaid systems.

A country's regulatory quality does not only influence the public sector but also affects sectors which are under state supervision as well as private sectors via legislation. The significantly negative effect of regulatory quality on voluntary prepaid financing indicates that compulsory (public) financing is favored over voluntary financing the higher the regulatory quality is.

Referring to the estimates using the dynamic model, column (4) of Table 1 reveals that GDP/capita negatively impacts the share of voluntary prepaid financing. This significantly negative influence contradicts our expectation that preferences for product diversification and, hence, for voluntary prepaid financing, increases with increasing income. The lagged dependent variable again indicates that the share of voluntary prepaid financing today is crucially determined by its share in the previous year.

Column (1) of Table 2 presents the probit estimates with respect to the probability of having voluntary prepaid sources in addition to compulsory prepaid financing. The significant determinants are in line with our expectations outlined in Section 3.2. We find that the likelihood of voluntary prepaid financing increases with increasing GDP/capita. This effect can be explained by more possibilities in richer nations for differentiating from an average coverage by buying supplementary insurance. Development assistance for health seems to crowd out voluntary prepaid financing by compulsory prepaid financing: The higher the development assistance for health the less likely it is that voluntary prepaid financing exists beside the compulsory sources. Finally, we find that regulatory quality reduces the likelihood of a coexistence of voluntary and compulsory

prepaid financing. This negative impact indicates that high regulatory quality in the public sector is rewarded by higher demand for compulsory prepaid financing than for voluntary prepaid financing.

Table 2: Probit estimates. Extensive margin.

Dep. Variable	<i>voloth</i> (1)	<i>taxshi</i> (2)
L.lngdpp_cons	1.843** (0.821)	-0.186 (0.202)
L.govrev	-0.010 (0.012)	-0.000 (0.004)
L.lpr	-0.037 (0.030)	0.001 (0.020)
va_agri	-0.037 (0.037)	-0.005 (0.010)
dah_cap	-0.014*** (0.005)	-0.003** (0.001)
popurb	0.012 (0.053)	0.023 (0.018)
pop65	-0.027 (0.098)	-0.029 (0.036)
myschool	-0.141 (0.192)	-0.004 (0.081)
democperm	0.306 (0.739)	-0.041 (0.131)
regqual	-1.100*** (0.299)	-0.142 (0.160)
Obs	2343	2343

Notes: *voloth* = Dummy. 1 if voluntary health insurance and other financing, 0 else. *taxshi*=1 if health care is financed via tax and SHI. Constant, time fixed effects and Mundlak terms not reported. Standard errors (clustered by country) in parentheses. *, **, *** indicate 10%, 5% and 1% levels of significance.

5.4 Determinants of compulsory health insurance as percent of compulsory financing arrangement

The third dependent variable describes the trade-off between compulsory health insurance and tax-financed health care. The sample size is reduced to 1406 observations in the static model and 1199 in the dynamic model due to the fact that in some countries a compulsory health insurance does not exist.

The output of the static model presented in Column (5) of Table 1 shows that the share of compulsory health insurance increases with increasing GDP/capita. This effect indicates that richer people prefer insurance-based systems which are superior in reflecting individual risk preferences compared to tax-financed systems. The negative impact of high regulatory quality on the share of compulsory health insurance may result from higher preferences for governmental health financing over social health insurance once the regulatory quality of the public sector is high. In the dynamic model we find that aside the significantly positive lagged dependent variable agricultural value added positively impacts the share of compulsory health insurance.

For 40 % of the observations we find that the compulsory financing arrangements only include tax-financed sources. We therefore are interested in the determinants of the extensive margin, i.e., the factors that influence the implementation of a social health insurance while tax-financed health care already exists. Column (2) of Table 2 shows that the development assistance for health is the only significant determinant. The significantly negative coefficient of DAH indicates that the probability of solely tax-financed health care increases with increasing development assistance for health. This is in line with the argument that governments have an incentive to use DAH for increasing their state budget and thereby gaining political benefits. Overall, the estimates in Table 5 indicate that countries with social health systems and tax financed health care do not significantly

differ in their contemporaneous characteristics from countries with only governmental health care financing. This comes as no surprise considering that the structure of health care financing results of a longer lasting development which is not captured by the set of contemporaneous explanatory variables.

5.5 Robustness Checks

Our robustness checks focus on the intensive margin to examine the sensitivity of our results with respect to the estimation procedure and the sample size. First, instead of transforming the shares into log-odds ratios we use the fractions as depend variables in the static model and follow Papke & Wooldridge (2008) who describe panel data methods for fractional response variables. Second, we drop countries whose population is smaller than 2 million. Third, we split our sample in rich and poor countries. We define poor countries as countries with a GDP/capita below 60 % of the median. All three robustness checks largely support our findings in the base regressions. In particular, in the dynamic models the lagged dependent variables always reveal a significantly positive influence on the current structure of health care financing. Governmental revenue positively influences *pre_che* and negatively impacts *vol_pre* but does not play a role for *hi_com*. Regulatory quality is a decisive factor for *vol_pre* and *hi_com* but not for *pre_che*. Development assistance for health mainly influences *vol_pre* positively and is of minor importance for *pre_che* and *hi_com*. As in the base model the remaining explanatory variables either only reveal a weak or no impact on the health care financing structures. Results for the robustness checks are available upon request.

5.6 Discussion

A comparison of the results from this study with the results from the more recent previous literature is only possible to a very limited extent. This is because we differ from this literature in several areas. First, our analysis focuses on structures in the financing of health care expenditures rather than on nominal values. Two of the dependent variables (namely *vol_pre* and *hi_com*) have not been analyzed before. Only the variable *pre_che* is comparable to one of the variables used in Fan & Savedoff (2014), namely to the out-of-pocket share of total health spending. However, aside the different time frame and geographical coverage, Fan & Savedoff (2014) use a smaller set of explanatory variables (incl. GDP per capita, governmental expenditures in % of GDP, population of 60+, and combinations of country and time dummies) which makes a comparison of the results difficult. What we can say is that our results are in line with respect to the three included explanatory variables in Fan & Savedoff (2014), considering that our dependent variable is not the share of out of pocket over total health expenditure rather than the share of prepaid health care financing in current health expenditures (i.e., the OOP expenditures are included in the denominator). Second, the current study uses a more comprehensive set of explanatory variables than previous literature to describe the countries' institutional, socio-demographic and economic characteristics. Third, our study uses current data (2000-2015) from the WHO's Global Health Expenditure Database (GHED). One of the improvements of the current data in their system of health accounts is that it is now feasible to distinguish between current health expenditures and capital health expenditure. Methodologically, we use log-odds-ratios of the dependent variables so that we can apply a standard fixed effects model and a dynamic fixed effects model.

Our empirical outcome reveals only a few significant determinants for the respective dependent variables which – we believe – is mainly due to our estimation strategy. First, we focus on within country variation by including country and time fixed effects which control for all country and time

specific factors. Second, the dependent variables picture the structure of health care financing and are measured in relative values (shares). Common tendencies comprised in variables such as GDP per capita, population 65+, or education for the numerator (e.g. nominal OOP expenditures per capita) and the denominator (e. g. nominal total current health expenditures per capita) are therefore cancelled out. For example, from previous empirical research it is well known, that GDP per capita is a good predictor for the absolute level of health expenditure per capita and consequently for health care financing (Gerdtham & Jönsson 2000, Xu et al. 2011). Our results indicate that this is not the case when we look at the relationship of GDP per capita and the structure of health care financing.

Third, the data to answer our research question is at the country level. These macro data represent the aggregates of individual decisions and make it difficult to adequately map the relevant constraints of the individual decision process. Although we use a quite comprehensive set of explanatory variables important determinants of the structure of health care financing are not included in our analysis due to the non-availability of valid data. This particularly holds for two variables: information on income (wealth) inequality and information on the distribution of health expenditure risks within the population. We assume that the choice between the different financing options is based on an individual economic trade-off between the expected benefits of a financing option (which are closely related to the individual health risks) and the financing burden (which is strongly related with income). Reliable information on income inequality (measured by the Gini-coefficient) is totally missing for many countries, resilient time series information over the whole time period 2000 – 2015 is missing for almost all countries. Information on health risks distribution is even worse so that the necessary matching of the income and health risk distribution is not possible. In addition, we expect that the individual decision on the different financing options is not based on present/transitory individual characteristics only but includes at least elements of a

life cycle perspective, a dimension which is not captured by the used macro data either. Individual data, or at least macro indicators that reflect the distribution of characteristics within the population of a country, would allow a more detailed analysis.

An assessment of the empirical results also needs a discussion of the definition of the dependent variables. Overall, the indicators *pre_che*, *vol_pre* and *hi_com* offer (highly) aggregated information on the role of prepaid health care financing. The use of financing shares on a macro basis measured by realized monetary values as an indicator for the role of prepaid financing has important implications for the interpretation of the data. The well-known WHO-cube of health care financing separates three dimensions of coverage by prepaid schemes: (i) the proportion of the population, which has coverage (breadth of coverage), (ii) the proportion of the services covered (depth of coverage), and (iii) the proportion of the costs covered (height of coverage). Our data set does not allow empirical statements regarding the role of the three dimensions of coverage by prepaid plans. The same share of prepaid financing in two countries is compatible with very different combinations of the three dimensions. In addition, these combinations will differ within the three modes of prepaid financing. This is an important limitation for an interpretation of the empirical picture from a normative perspective. In this respect it is also important to emphasize that we cannot draw conclusions whether the health care services – the benefit catalogue - financed by prepaid plans are appropriate, effective, efficient and further the goal of equity or not.

The different dimensions of performance are important from the perspective of universal health coverage. This concept does not only include the financial dimension but also the availability of an appropriate basket of health care services. Recent empirical work by Wagstaff et al. (2015) for 24 developing countries offers strategies to enlarge our perspective. They present a workable definition of the universal health concept and formalize an index, which includes two dimension: (i) financial protection (nobody should suffer financial hardship as a result of needing care) and (ii)

service coverage (everyone, irrespective of his ability to pay should have access to the needed services). It is obvious, that the role of specific forms of prepaid financing as we focus on is a good proxy for the financial domains. We admit, that the enlargement of our concept of financial protection by the dimension “service coverage” is necessary, but due to the lack of worldwide data on service coverage we have to leave the implementation of this step to future work.

Preliminary results with an approach similar to that of Wagstaff et al. (2015) offers a recent paper by Feigl & Ding (2013). The authors study economic, social and political determinants of universal health coverage in a longitudinal study of 194 countries and also use a formal indicator of coverage including the following domains: (i) percentage of the population included in a public or private prepaid health care plan, (ii) access to health care services measured by the percentage of skilled attendance at birth, (iii) legal universal coverage. Legal universal coverage was identified by studying country specific legislative texts which indicated whether the entire population/citizenry was covered in the health plan and was granted access to a core set of services. The description of the included domains reveals the fundamental difference of the Feigl & Ding (2013) study and our study thereby leaving aside differences in the econometric approach: We study realized monetary values for the role of prepaid financing while Feigl & Ding focus at the existence of entitlements. Finally, our data does not reveal information on the relationship between the different prepaid financing options and on the relationship between prepaid financing and OOP. Basically the different forms can be substitutes or complements. This is particularly true for social health insurance and voluntary prepaid financing. For the situation in OECD countries see Colombo & Tapay (2004).

6. Conclusions

We use a static as well as a dynamic panel data analysis to examine the role of economic, socio-demographic, political and institutional country characteristics for three indicators of the structure of health care financing. The first indicator, the share of total prepaid financing as percent of total current health expenditures, measures the relative importance of total prepaid health care financing compared to out-of-pocket (OOP) payments. The second dependent variable is the share of voluntary prepaid financing as percent of total prepaid financing which relates voluntary to compulsory prepaid financing. Finally, we use the share of compulsory health insurance as percent of total compulsory financing arrangements as the third indicator for health care financing and thereby distinguish between compulsory health insurance and tax financed health care.

The dynamic model reveals that the current structure of health care financing is crucially determined by the past. In all of the specifications the lagged dependent variable is significantly positive. Aside the importance of the previous structure of health care financing we find that governmental revenue positively influences the share of prepaid financing and negatively impacts the share of voluntary prepaid financing. Voluntary prepaid financing is rising with increasing development assistance for health but decreases with a country's regulatory quality. We further find that a high development assistance for health and regulatory quality reduce the probability that voluntary and compulsory health insurance coexist.

The countries' GDP per capita, agricultural value added, degree of urbanization, and the share of the elderly only play a minor role in explaining the countries' health care financing structures.

Based on the findings in this analysis we argue that more detailed information is needed to adequately capture the individual constraints and decisions related to health care financing. In particular, two variables seems crucial for the individual health care financing decisions: income

and health expenditure risks (Gouveia 1996). Future studies that use individual data, or at least macro indicators which reflect the distribution of income (wealth) and health expenditure risks within a country's population would allow for a deeper insight into the decisive determinants for the health care financing structures.

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Appendix

Table A1: Data sources

Database	Link/Reference	Variables used
WHO, Global health Expenditure Database	https://apps.who.int/nha/database/Select/Indicators/en	<i>pre_che, vol_pre, hi_com</i>
World Bank, World Development Indicators	http://databank.worldbank.org/data/source/world-development-indicators	<i>gdppc_cons, lpr, va_agri, popurb, population</i>
IMF, World Economic Outlook Database	https://www.imf.org/external/pubs/ft/weo/2015/02/weodata/index.aspx	<i>govrev</i>
Institute of Health Metrics and Evaluation	http://ghdx.healthdata.org/record/development-assistance-health-database-1990-2016	<i>dah</i>
UN, Human Development Reports	http://hdr.undp.org/en/data	<i>myschool</i>
Center for Systemic Peace and Societal-Systems Research, Polity IV project, Political Regime Characteristics and Transitions, 1800-2013	http://www.systemicpeace.org/inscrdata.html	<i>polity2, democperm</i>
World Bank, Worldwide Governance Indicators Project	http://info.worldbank.org/governance/wgi/#home	<i>regqual</i>

Table A2: Descriptive statistics

Variable	Obs	Mean	Min	Max	Description of variables
Dependent Variables					
pre_che	2343	0.63	0.03	0.97	Total prepaid financing as percent of total current health expenditures
pre_che_lo	2343	0.63	-3.48	3.48	Log-odds ratio of pre_che
vol_pre	2343	17.25	0	93.33	Voluntary prepaid financing as percent of total prepaid financing
vol_pre_lo	2248	-1.92	-4.47	2.64	Log-odds ratio of vol_pre
hi_com	2343	26.43	0	100.00	Compulsory health insurance as percent of compulsory financing arrangement
hi_com_lo	1406	-0.37	-4.37	4.36	Log-odds ratio of hi_com
voloth	2343	0.96	0	1	Dummy. 1 if voluntary and compulsory financing coexist, 0 else.
taxshi	2343	0.60	0	1	Dummy. 1 if compulsory health insurance and government financing coexist, 0 else.
Explanatory Variables					
L.lngdppcons	2343	8.30	5.25	11.63	One year lag of ln(GDP per capita constant)
L.govrev	2343	28.58	0.64	72.51	One year lag of general government revenue (%)
L.lpr	2343	67.54	38.10	90.34	One year lag of labor force participation rate (%)
va_agri	2343	13.29	0.03	79.04	Agriculture, value added (% of GDP)
dah_cap	2343	5.68	0	182.07	Development assistance for health per capita
popurb	2343	55.59	8.25	100.00	Urban population (%)
pop65+	2343	7.73	0.75	26.02	Population ages 65 and above (% of total)
myschool	2343	7.66	1.10	14.10	Mean years of schooling
democperm	2343	0.50	0	1	Percentage of democratic years (1980-2015)
regqual	2343	-0.02	-2.63	2.26	Regulatory Quality
Variables needed for calculation					
cfa_che	2343	52.35	3	95	Compulsory Financing Arrangements as % of Current Health Expenditure
vhi_che	2343	4.47	0	50	Voluntary Health Insurance as % of Current Health Expenditure (CHE)
other_che	2343	5.90	0	60	Other Financing Arrangements as % of Current Health Expenditure (CHE)
gdppc_cons	2343	12139.54	193.87	111968.40	GDP per capita (constant 2005 US\$)
govrev	2343	28.75	0.64	72.51	General government revenue (in % of GDP)
lpr	2343	67.63	38.10	90.34	Labor force participation rate, total (% of total population ages 15-64)
dah_15	2343	87.40	0	1570.00	Development assistance for health (in million constant 2014 USD)
polity2	2310	4.26	-10	10	Combined polity score
ydemoc	2343	14.40	0	36	Number of democratic years (1980-2015)

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Andrea M. Leiter, Engelbert Theurl

DETERMINANTS OF PREPAID SYSTEMS OF HEALTHCARE FINANCING - A WORLDWIDE COUNTRY-LEVEL PERSPECTIVE

Abstract

In this paper we examine determinants of prepaid modes of health care financing in a worldwide cross-country perspective. We use three different indicators to capture the role of prepaid modes in health care financing: (i) the share of total prepaid financing as percent of total current health expenditures, (ii) the share of voluntary prepaid financing as percent of total prepaid financing, and (iii) the share of compulsory health insurance as percent of total compulsory financing arrangements. We refer to a panel data set comprising 158 countries and covering the time period 2000-2015. We apply a static as well as a dynamic panel data model.

We find that the current structure of prepaid financing is significantly determined by its different forms in the past. The significant influence of governmental revenues, development assistance for health and regulatory quality varies depending on the financing structure we look at. The country's GDP per capita, the agricultural value added, the degree of urbanization and the share of the elderly are only of minor importance for explaining the variation in a country's structure of health care financing.

From our analysis we conclude that more detailed information on indicators which reflect the distribution of individual characteristics (such as income and health risks) within a country's population would be needed to gain deeper insight into the decisive determinants for prepaid health care financing.

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