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The Role of Pharmaceutical Expenditure**

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The Role of Pharmaceutical Expenditure**

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Abstract

Trust in physicians is the fundamental social mechanism in the health sector to address the issue of uncertainty in the effectiveness of health care and asymmetric information between patients and physicians. As health systems are so diverse in the world, there are substantial differences across nations in trust in physicians. Few studies have paid attention to the link between the characteristics of health system and patient trust in physicians. This study used 2011 International Social Survey Programme data to explore the potential mechanism in accounting for cross-country heterogeneity in trust in physicians. We hypothesize that physician-induced demand in the pharmaceutical sector shapes the perception that physicians serve as imperfect agents to their patients, which in turn lowers trust in physicians. Specifically, we used the share of pharmaceutical expenditure in total health expenditure as a proxy measure of physician-induced demand in prescription drugs, and we found that individuals were more likely to believe that physicians serve as imperfect agent if their countries spend a high share of health care costs on pharmaceutical products. In addition, our cross-country analysis shows a significant negative relationship between the perception of imperfect agency and trust in physicians.

Keywords: pharmaceutical expenditures, imperfect agency, trust in physicians.

I. Introduction

It has been widely recognized that the health care market is characterized by uncertainty and information asymmetries. As Arrow (1963) stated, delegation and trust in physicians are the social institutions designed to address these problems. As a result, physicians serve as agents to make decisions on behalf of patients by providing diagnoses, treatments and drug prescriptions. Trust plays a key role in the physician–patient relationship to assure that physicians would be the perfect agents for their patients, and decisions are made in a way that patients would choose if they were fully informed. Thus, trust in physicians has been classified as one of the deeper factors that affects the efficiency and outcomes of the health care sector (Arrow, 1963; Hall et al., 2001).

However, in real world, the patient’s trust in their physicians is not constant and unbroken. In recent years, there was a concern on the decline in physician trust over time (Ahern and Hendryx, 2003; Blendon et al., 2014). Meanwhile, the level of public trust in physicians as a group is not homogeneous across countries (Blendon et al., 2014). In a 32-country survey, the mean level of public trust in physicians, as measured by the proportion of adults who agree with the statement, “All things considered, doctors can be trusted.”, ranges from 0.45 in Poland to 0.86 in Spain. The heterogeneity of trust in physicians across countries raises an important research question on how to explain this cross-country heterogeneity.

This paper aims to proposal a hypothesis to explain the international variations in the public trust in physicians and empirically test this hypothesis by using data obtained from cross-country survey conducted by the International Social Survey Programme (ISSP), a cross-national collaboration among universities and independent research institutions (ISSP Research Group, 2015). Specifically, we hypothesize that the extent of physician-induced demand in the pharmaceutical sector plays a key role in accounting for the cross-country variation in the level of public trust in physicians.

II. Method

2.1 Conceptual Framework

In the real world, the operation of the health care market is far from ideal. The existence of asymmetric information between physicians and patients give physicians advantage position to act as imperfect agents due to interest conflicts. It is evident in the literature that physicians act as imperfect agent through the demand inducement, that is, physicians use their information advantage to increase the volume of their services that a well-informed consumer would not want to use (Yip 1998; McGuire 2000). In practice, the major sources of information asymmetry that may induce physicians to act as imperfect agents mainly lie on the choice of treatment procedures, such as the choice between normal childbirth and cesarean section delivery (Gruber and Owings, 1996), and the choice of prescription drugs (Iizuka 2007; Liu et al., 2009). Physicians may be unduly influenced by financial motivation because they earn a higher income from performing certain treatment procedure or earn a profit directly from prescribing specific drugs.

Compared to surgical procedures, physicians have more opportunities to induce demand through the prescription drugs, as the pharmaceutical products are frequently used in the treatment of diseases. Thus, the pharmaceutical sector is an easy target for physicians to exercise their market power to induce demand. We hypothesize that country with a stronger demand inducement in the pharmaceutical products is associated with a lower patient trust in their physicians through a two-stage process. First, media coverage and word-of-mouth stories about the demand inducement in the pharmaceutical products have shaped patients' perception that physicians serve as imperfect agents. Second, the perception of imperfect agency puts patient in a difficult position to trust that their physicians generally put their health and interest as their top priority (Dwyer et al., 2012; Tam 2012). Thus, it is expected to observe a negative relationship between the perception of imperfect agency and trust in physicians.

We test our hypothesis through the approach of backward induction. First, we test whether our data obtained from the cross-country survey support the negative relationship between the perception of imperfect agency and trust in physicians. Second, we test whether the health system associated a higher demand inducement in

pharmaceutical products leads to a higher perception of imperfect agency in health care market.

2.2 Data source

In this study, we use data obtained from 2011 ISSP (International Social Survey Programme) to test our hypotheses. The ISSP is a cross-national collaboration programme, which has been continuously conducting annual surveys on diverse social science topics since 1985 (ISSP Research Group, 2015). The topic of the 2011 survey was health and health care, which provides several key variables for our study. The survey was conducted in 32 countries, by face-to-face interviews with individuals aged 18 and older. Since the survey was conducted independently in different countries, the timing of the survey varied across countries, beginning in February 2011 and ending in April 2013. In addition, there was variation in sample size across countries, ranging from 928 in the United Kingdom to 5,424 in China. The total number of observations in the 2011 survey was 55,081, with a mean sample size per country of about 1,727.

Among various questions in the survey, two questions generated evidence for key variables for our study. First, respondents were asked how much they agree or disagree with the statement: “Doctors care more about their earnings than about their patients.” Respondents answered on a five-point Likert scale, varying from 1 to 5 (1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree, and 5=strongly disagree). Based on the answer to this question, we constructed an indicator for the perception of imperfect agency, which equals 1 if the respondent answered “strongly agree” or “agree” and 0 otherwise. The advantage of using a simple binary variable to measure the perception of imperfect agency is that the results can be compared across countries.

Second, respondents were asked to rate how much they agree or disagree with the statement: “All things considered, doctors can be trusted.” Thus, we constructed a trust indicator that equals 1 if the respondent answered “strongly agree” or “agree” and 0 otherwise.

III. Results

3.1 Evidence from First Test: the Relationship between Trust in Physicians and the Perception of Imperfect Agency

Based on the average responses to the trust question obtained from 32 countries, Figure 1 reports that mean trust levels (measured by the percentage of samples expressing trust in physicians) range from 0.45 in Poland to 0.86 in Spain, indicating that there are substantial variations in trust levels across countries.

Similarly, based on the average responses to the question on whether doctors care more about earnings obtained from 31 countries, Figure 2 reports that the mean of perception of imperfect agency (measured by the percentage of respondents expressing agreement on the question) range from 0.15 in Sweden to 0.68 in Bulgaria.¹ This indicates substantial variation in the perception of imperfect agency across countries. Overall, countries in Northern and Western Europe, such as Sweden and the Netherlands, are associated with a low perception of imperfect agency. In contrast, countries in East Asia and Eastern Europe are associated with a high perception of imperfect agency. For example, about two thirds of survey respondents in China agree with the statement that doctors care more about their earnings than about their patients.

Figure 3 reports the scatter diagram and the fitted value on the relationship between the indicator of trust in physicians and the indicator of imperfect agency, based on the sample mean obtained from 31 countries. As expected, we observe a significant negative association between these two indicators, suggesting that individuals are less likely to trust in their physicians if they believe that physicians serve as imperfect agency for them. The estimated coefficient obtained from the linear simple regression model is -0.39, indicating that one percentage point increase in the perception of imperfect agency leads to a reduction in the trust level by 0.39 percentage point. However, China appears to be an outlier in the sample, as China

¹ The survey conducted in Spain did not contain this question.

shows a high mean trust level and a high perception of imperfect agency. Overall, our evidence support the conventional wisdom in literature that physician agency is one of the important attributes to shape trust in physicians.

3.2 Evidence for the Second Test: The Link between Physician Inducement and the Perception of Imperfect Agency

A styled fact in the global comparison of health care expenditure is that the relative importance of pharmaceuticals varies across countries, as there is substantial variation in the share of health care costs spent on pharmaceuticals. Some countries such as the United States and Sweden spend only about 10 to 12 percent of health expenditures on pharmaceuticals, while other countries such as South Korea and Poland allocate about one fourth of their health care budgets on prescription drugs (OECD, 2016). In low and middle-income countries such as India and China, spending on pharmaceuticals accounts for nearly half of their total health expenditures (WHO, 2011).

A plausible explanation for the global variation in the share of pharmaceutical expenditures may reflect the fact that countries have a different optimal mix of inputs in producing good health for their citizens. However, a growing body of research has accumulated evidence that some incentive mechanisms inherited in the health care systems of some countries, such as fee-for-service payment systems and the integration of prescribing and dispensing, provide incentives for physicians to induce demand for pharmaceutical products (Iizuka, 2007; Kaiser and Schmid, 2016), which in turn can contribute to higher pharmaceutical expenditures. Therefore, we use the share of pharmaceutical expenditures as a proxy to measure the extent of physician-induced demand in the pharmaceutical market under the assumption that a higher demand inducement in the pharmaceutical products would lead to a higher share of pharmaceutical expenditure.

Since the ISSP survey does not contain information on pharmaceutical expenditure and total health expenditure, we obtain information on the share of total

health expenditure spent on pharmaceutical product through OECD Health Statistics.² However, this variable is missing in 8 countries and hence we use information obtained from 24 countries to proceed the analysis. Based on a cross-sectional comparison across 24 countries in 2011, Figure 4 shows that the majorities of countries spend about 10 to 20 percent of their health expenditures on pharmaceutical products. Some East Asian countries and East European countries have a higher share of pharmaceutical expenditure, ranging from 20.4% in the Czech Republic to 28.7% in the Slovak Republic. China is the only country in our data set that spend more than 30% of health care expenditure on pharmaceutical products.

Figure 5 reports the scatter diagram and the fitted line on the relationship between the perception of imperfect agency and the share of pharmaceutical expenditures in each country. The results showed a significantly positive association, indicating that individuals are more likely to hold a perception of imperfect agency if their countries spent a large share of health care spending on pharmaceutical products. In this figure, China is a palpable example where higher pharmaceutical expenditures are associated with a high perception of imperfect agency. The estimated coefficient obtained from the simple linear regression model is 1.74, indicating that one percentage point increase in the share of pharmaceutical spending leads to an increase in perception of imperfect agency by 1.74 percentage points.

IV. Discussion

In this study, we show the evidence for three stylized facts regarding global variation in the level of public trust in physicians. First, we find that the level of trust in physicians is not homogeneous across countries. People in some countries, such as Spain and Switzerland, have relatively higher trust in their physicians, while people in the other countries, such as Russia and Poland, have relatively lower trust. Second, we find a significant negative relationship between the level of trust in physicians and the perception of imperfect agency, indicating that individuals are less likely to trust their

² For OECD countries, data on the share of pharmaceutical expenditures were obtained from OECD Health Statistics; for non-OECD countries (China and Taiwan), this share was calculated using the annual health statistics report published by the individual countries.

physicians if they have a perception of imperfect agency about their doctors. Third, we find that individuals are more likely to have a perception of imperfect agency if their countries spend a higher share of health care costs on pharmaceutical products, indicating that the induced demand in the pharmaceutical sector is the key factor to account for the perception of imperfect agency. Putting together, our study supports the argument that physician-induced demand in the pharmaceutical sector plays an important role in accounting for the cross-country heterogeneity in trust in physicians.

Overall, our finding on the global variation in trust in physicians is consistent with the international variations in general trust. In the World Values Survey (WVS), the respondent was asked by the following question: “Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?” Based on the answer to this question, researchers often construct a trust indicator which equals 1 if the respondent answers “most people can be trusted” and 0 otherwise (Delhey et al. 2011; Algan and Cahuc, 2014). The result also shows substantial differences in general trust across nations, ranging from 68% of the population trusts others in Norway to only 3.8% of the population exhibits interpersonal trust in Trinidad and Tobago (Algan and Cahuc, 2014). The result also shows that the trust level in China is very high, ranking number 4 among the 111 countries in WVS (Algan and Cahuc, 2014). This is similar to our finding obtained from ISSP survey that the trust level in China is also very high in spite of the fact that about two thirds of survey respondents in China believed that doctors care more about their own earnings. This raises a concern on whether respondents in different countries have a different understanding on the meaning of trust in physicians.

Delhey et al. (2011) suggest that people may have a different radius of relationship in mind when they answer the standard question in the general trust survey. They developed a radius-adjusted trust score that takes into account the variation of the radius of trust across countries. Their results indicate that the radius of “most people” is narrower in Confucian countries such as China and South Korea and wider in Western countries. After this adjustment, the ranking of trust level for China slides down roughly 10 places among 51 countries in their study sample. This

explanation implies that the survey respondents in China may have interpreted the question on whether doctors can be trusted as “my doctor” instead of “doctors in general.” This speculation is consistent with the findings reported in two local surveys conducted in Beijing and Shanghai, respectively. Both studies selected survey respondents from public hospitals. In this survey setting, people are more likely to interpret of the survey question as “trust in a specific known physician” instead of “trust in physicians in general.” As a result, both studies found that respondents reported a high level of trust in their physicians (Tam, 2012; Zhao et al., 2016).

By contrast, Zhao et al. (2018) examined the level and the determinants of public trust in China’s health care system, and found that only 28% of respondents reported that they had a great deal or complete trust in China’s health care system. This provides additional evidence to our argument that the survey respondents in the ISSP data may have interpreted questions about trust in physicians as trust in a specific known physician. As trust in the health care system is close to, “trust in physicians in general,” we speculate that their findings may also reflect a low trust in physicians in general.

V. Conclusion

This paper uses data obtained from 2011 ISSP cross-country survey and OECD Health Statistics to explore the association between physician-induced demands in the pharmaceutical products and trust in physicians. Based on country-level analyses, we find evidence to support our argument that the perception of imperfect agency arising from persistent demand inducement in the pharmaceutical sector erodes patient trust in physicians. Specifically, we use the share of health care expenditures spent on pharmaceutical products as a proxy measure of physician-induced demand in pharmaceutical products. We find that on average people are more likely to hold a perception that physicians serve as an imperfect agent if their country spends a larger proportion of their health care budget on pharmaceutical products. In addition, we find a significant negative association between the perception of imperfect agency and trust in physicians.

Our results shed new light on the important link between physician-induced demand in the pharmaceutical sector and lower trust in physicians. This in turn may further increase costs to the health care sector through several channels, such as reducing patient adherence to treatments and increasing the number of physician visits to assure the appropriateness of medical treatment.

An important policy implication for our study is that policies designed to mitigate physician-induced demand in the pharmaceutical sector may have a double-dividend in return. On one hand, cutting the overuse of prescription drugs directly saves health care costs. On the other hand, these policies may be beneficial to restore the trust relationship between physicians and their patients, which in turn may also contribute to cost savings in the form of reducing transaction costs in the health care sector. As noted in the literature, potential policies include reforms in the pharmaceutical sector to delink prescribing behaviors and profit, payment system reform to move away from fee-for-service to bundle payments, and strict regulation on the marketing of pharmaceutical products to deter the pharmaceutical manufacturers' undue influence on physician prescribing behavior.

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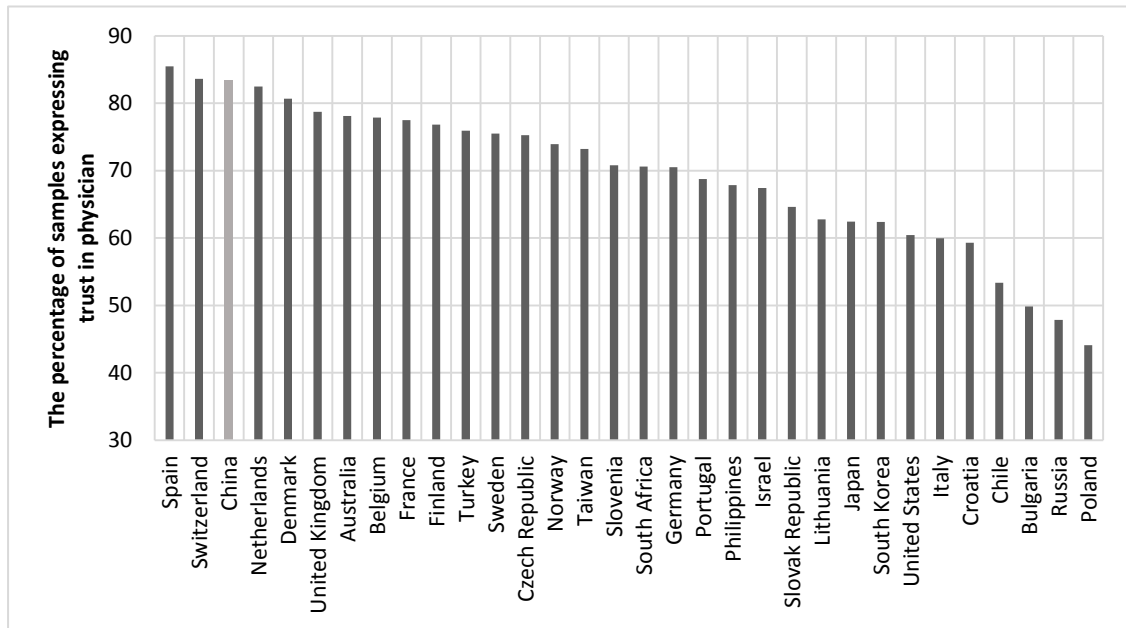


Figure 1 The percentage of samples expressing trust in physicians

Source: 2011 ISSP

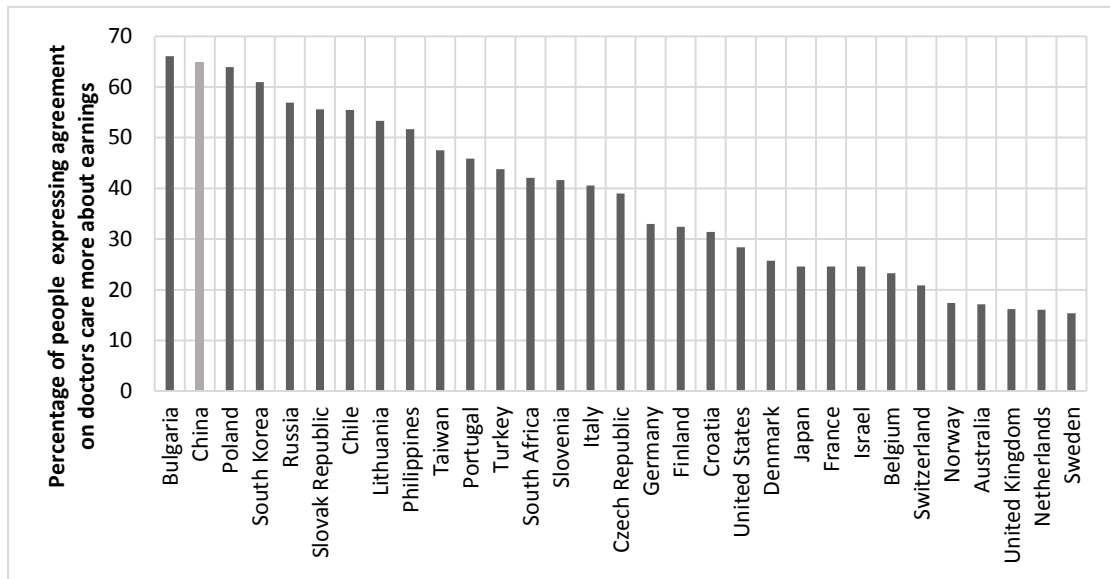


Figure 2 Mean of the perception on imperfect agency

Source: 2011 ISSP

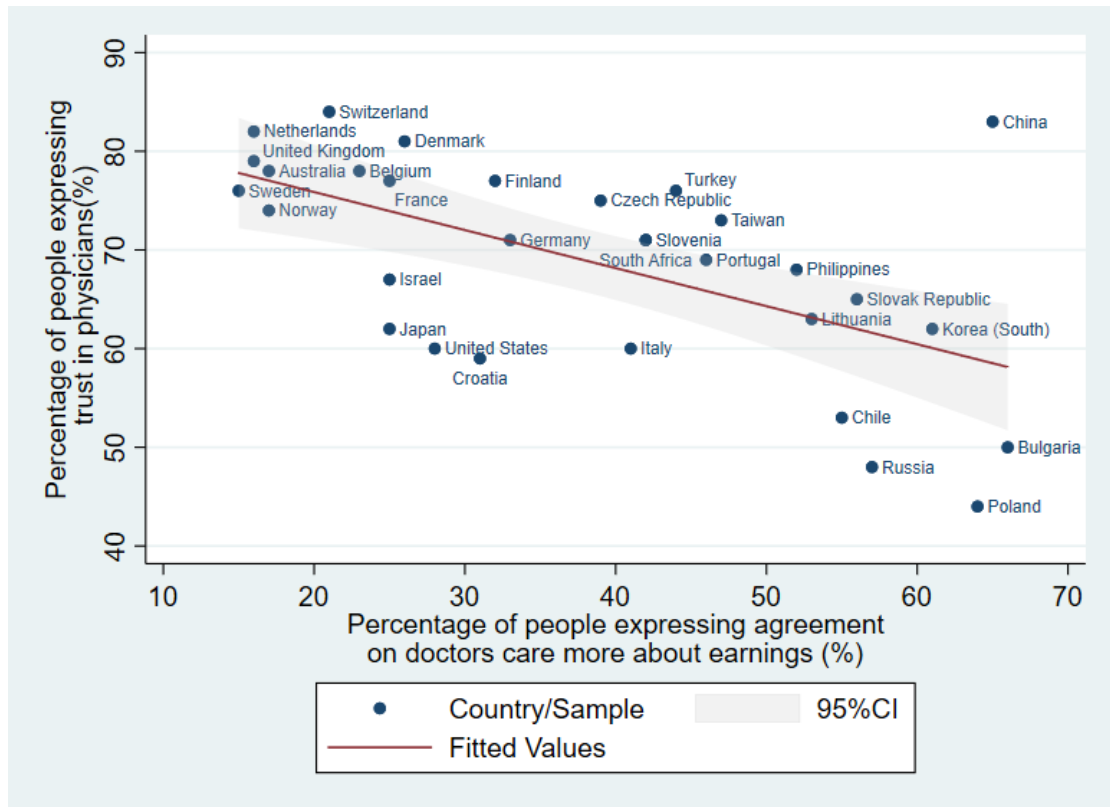


Figure 3 Scatter diagram and fitted line for the relationship between trust indicator and imperfect agency indicator

Source: 2011 ISSP, and calculated from the authors.

Note: The estimated results of the fitted line is $Y=83.58-0.39X$, where Y=percentage of people expressing trust in physicians and x=percentage of people expressing agreement on doctors care more about earning.

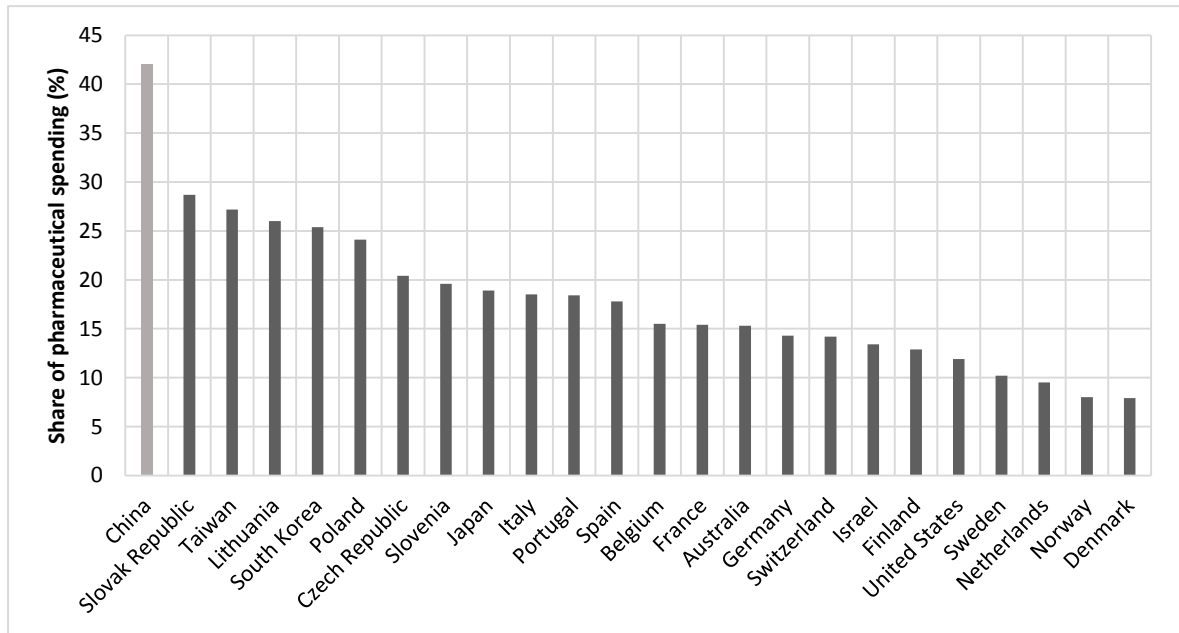


Figure 4 The share of pharmaceutical spending of 24 countries, 2011

Source: For OECD countries, data on the share of pharmaceutical expenditures were obtained from OECD Health Statistics; for non-OECD countries (China and Taiwan), this share was calculated using the annual health statistics report published by the individual countries.

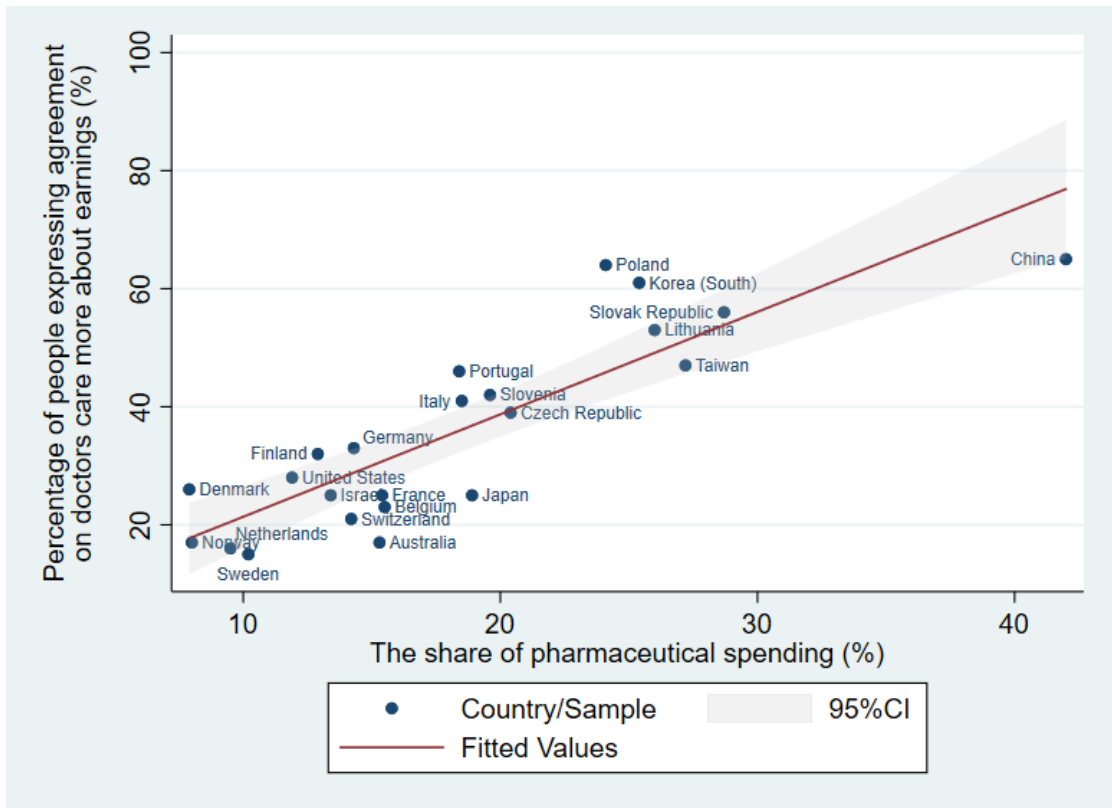


Figure 5 Scatter diagram and fitted line for the relationship between the mean of perception on imperfect agency and the share of pharmaceutical spending

Source: For OECD countries, data on the share of pharmaceutical expenditures were obtained from OECD Health Statistics; for non-OECD countries (China and Taiwan), this share was calculated using the annual health statistics report published by the individual countries.

2. 2011 ISSP

Note: The estimated results of the fitted line is $Y=4.01+1.74X$, where Y=percentage of people expressing agreement on doctors care more about earning and X=the share of pharmaceutical expenditure.