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Co-payments and the demand for pharmaceuticals: Evidence from Italy

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ABSTRACT

This study exploits a natural experiment in Italy to estimate how the demand for pharmaceuticals responds to variations in co-payment levels. After a period where co-payments were set to zero by a national law, the decision over co-payments was devolved to the Italian regions. While some regions re-introduced the co-payment, others did not. Using a difference-in-difference approach on regional monthly data for years 2001 and 2003, we find that an *increase* in the co-payment by one Euro reduces the per capita number of prescriptions by 4% and per capita public pharmaceutical expenditure by 3.4%. We also find evidence that when in 2006 some regions reduced (but not removed) the co-payment, a *reduction* in the co-payment by one Euro increased the per capita number of prescriptions by 3.4%, and per capita public pharmaceutical expenditure by 4.9%.

1. Introduction

Pharmaceutical expenditure is growing in many OECD countries (Maynard and Bloor, 2003). The average pharmaceutical expenditure in the OECD has increased from 1% of GDP in 1990 to 1.45% in 2007 (OECD Health Database 2007). It accounts for a substantial part of total health expenditure, about 17% in 2007 across OECD countries. Policymakers often argue that the introduction of an increase in co-payments is a possible solution to the rise of pharmaceutical expenditure. This policy has two main advantages: i) it reduces moral hazard, by discouraging patients with low expected benefit to purchase the medicine, and, ii) it raises revenues for the government.

Health insurance theory suggests that the optimal co-payment when health care is not contractible is such that it trades off insurance (equalisation of marginal utilities across health states) with moral hazard (allocative efficiency requires equalisation of marginal benefit with marginal cost). Suppose that a representative individual's health can take two possible states: 'healthy' or 'sick'. On one hand, the patient would like the marginal utility of consumption to be identical when healthy and sick. If utility is not health dependent, this would imply consumption to be identical when healthy and sick so that the implied co-payment is zero (full insurance). However, if health care is not contractible, zero co-payments encourage excessive consumption up to the point where the marginal benefit from health care is equal to zero (allocative inefficiency). Therefore, setting a co-payment at zero is sub-optimal because patients demand excessive care. Setting a co-payment equal to the cost of health care is also sub-optimal because it eliminates insurance. The optimal co-payment lies between zero and the full cost of health care. Moreover, the optimal co-payment is inversely related to the elasticity of demand (see for example Zeckhauser, 1970; Pauly, 1974; Zweifel and Breyer, 1997; Gravelle and Rees, 2004, chapter 19; Gravelle and Siciliani, 2008). This result is intuitive. The higher is the elasticity of demand, the higher is the scope for containing moral hazard. Indeed we observe in many OECD countries that the optimal co-payment is negligible for certain types of health care, like surgery, as the demand is likely to be unresponsive to price, while it is positive for others, like dental care, or pharmaceuticals.

We may wonder why the number of prescriptions is reduced when a co-payment is introduced. Since doctors do not pay for pharmaceuticals, why would a co-payment reduce the number of prescriptions? As commonly argued within the health-economics literature doctors act (at least to some extent) as agents for the patients and therefore take into account the preferences of the patients when deciding about the healthcare provided (Ellis and McGuire, 1986; Chalkley and Malcomson, 1998; Zweifel and Breyer, 1997; Brekke, Königbauer and Straume, 2007). It is only if doctors are completely self-interested, that we would expect the co-payment to have little or no effect on the demand for prescriptions. However, even in that case, although it is the doctor who decides whether to provide or not a prescription, it is ultimately the patient who decides whether to buy or not the drug, and therefore to pay or not the co-payment.

The main implication from the theoretical literature for the pursuit of empirical work is that an accurate estimation of the responsiveness of demand is critical for policy makers to set optimal co-payments. In

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this study, we estimate the responsiveness of demand with respect to co-payment levels using Italian data. Policy makers are interested not only in the effect of co-payments on demand, but ultimately on the effect of the co-payment on public pharmaceutical expenditure. Therefore, we also test the overall effect of co-payments on public pharmaceutical expenditure.[1]

The empirical literature estimating the responsiveness of demand for pharmaceuticals is limited. Evidence from the Rand Health Insurance Experiment carried out in the US in the eighties suggests that the demand for pharmaceuticals responds to co-payments. Leibowitz, Manning and Newhouse (1985) find that overall "individuals with more generous insurance buy more prescription drugs". More precisely, people who had a co-insurance rate of 95% spent 57% as much as those on the free plan. O'Brien (1989) uses time-series data from the English NHS during the period 1969–1986. He finds that the elasticity of the number of prescriptions with respect to the co-payment is between −0.33 and −0.64. Ryan and Birch (1991) use a similar database for the period 1979–1989. They find that the elasticity is significantly lower and equal to −0.11. Using data until 1992 and testing for co-integration, Hughes and McGuire (1995) find an elasticity of −0.32. Exploiting a natural experiment in Canada, Contoyannis et al. (2005) employ an instrumental-variable approach and find that the elasticity of drug expenditure with respect to price is between −0.12 and −0.16. Street, Jones and Furuta (1999) use data from Russia and show that patients who are fully exempted from prescription charges have a higher utilisation of prescription items. Using aggregate Italian data for the period 1963–1994, Atella (2000) investigates the effects of the introduction of a reference price policy to contain pharmaceutical expenditure in Italy. He finds that reference price helps to control pharmaceutical expenditure in the short run, but not in the long run. Although this is not the main focus of his paper, he also finds that the elasticity of public pharmaceutical expenditure to co-payments is −0.4. Pamolli et al. (2007) estimate a simultaneous equation system of the determinant of pharmaceutical expenditure, the cost of pharmaceutical products, and the consumption of generics using Italian data over the periods 1995–2005. They find that reference pricing increases the amount of generic pharmaceuticals; a higher diffusion of generics reduces the cost of generics; a higher cost of pharmaceuticals increases pharmaceutical expenditure while a higher co-payment reduces it. There is also a broader literature on the determinants of pharmaceutical expenditure in particular in relation to GDP and healthcare expenditure (Clemente, Marcuello and Montañés, 2008, Okunade and Suraratdecha, 2006), reference pricing (Grootendorst and Stewart, 2006), drug compliance (Atella et al., 2006), its prediction using demographic and morbidity information (García-Goñi, Ibern, 2008), the cost of innovation (Di Masi et al., 1991), and its impact on life expectancy (Caliskan, 2008).

In this study we take advantage of a natural experiment in Italy to estimate the effect of variations in the level of the co-payments on the demand for pharmaceutical prescriptions. We make use of intra-regional variations and two exogenous shocks. Fig. 1 depicts the average co-payment per prescription for a selection of Italian regions for each month between year 2000 and 2007. After a period where co-payments ranged between 2 and 3 Euro, the co-payment was abolished in January 2001 due to a law of the national government (first shock). However, after few months they were reintroduced (second shock) but the decision on the co-payment level was devolved to the twenty Italian regions. Fig. 1 shows that regions differed in the amount of co-payment reintroduced. During year 2001 the co-payment was about zero in all regions. In year 2003, Piemonte, Lombardia and Liguria introduced a co-payment over 2 Euro; Autonomous Province of Bolzano, Veneto, Puglia, Calabria, and Sicilia chose a co-payment of about 2 Euro; Lazio and Molise chose a co-payment close to 1 Euro per average prescription. The remaining regions left it at about zero.

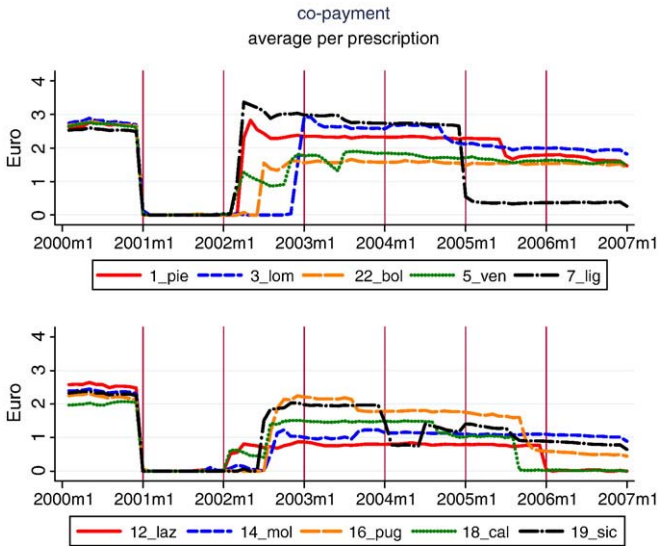

Fig. 1. Average co-payment per prescription for a selection of Italian regions. Source: authors' calculation using Federfarma data (www.federfarma.it). Note: only regions where a co-payment was introduced after year 2001 are presented in this figure. The twenty-one Italian regions are: Piemonte (1_pie), Valle d'Aosta, Lombardia (3_lom), Autonomous Province of Bolzano (22_bol), Autonomous Province of Trento, Veneto (5_ven), Friuli Venezia Giulia, Liguria (7_lig), Emilia Romagna, Toscana, Umbria, Marche, Lazio (12_laz), Abruzzo, Molise (14_mol), Campania, Puglia (16_pug), Basilicata, Calabria (18_cal), Sicilia (19_sic), Sardegna.

This represents an ideal setting for a natural experiment of the effect of a co-payment on the demand for pharmaceutical prescriptions. After a situation where the co-payment was zero across all Italian regions, some regions (those reported in Fig. 1) decided to introduce the co-payment (treatment group) by varying amounts, while others did not. The latter can therefore act as the control group. Moreover, since 2004, some regions (namely Calabria, Sicilia, and later Piemonte, Lombardia, Liguria, Lazio and Puglia) who had re-introduced the co-payment, reduced its average amount, while the others left it at 2003 levels. Again, the latter group can be used as control for a decreasing co-payment policy for assessing whether the effects of co-payments on average number of prescriptions is symmetric. Using a difference-in-difference approach on regional monthly data for years 2001 and 2003, we find that an increase in the co-payment by one Euro reduces the per capita number of prescriptions by 4% and per capita public pharmaceutical expenditure by 3.4%. We also find evidence that when in 2006 some regions reduced (but not removed) the co-payment, a reduction in the co-payment by one Euro increased the per capita number of prescriptions by 3.4%, and per capita public pharmaceutical expenditure by 4.9%. When interpreting these results in relation to other studies, two issues need to be emphasised. The first is that the co-payment itself is quite low (around one or two Euro), and therefore most patients may be able to afford such co-payment. The second is that some patients (namely elderly patients, patients with chronic illness and low-income patients), are exempt and are therefore not influenced by the co-payment. The study is organised as follows. Section 2 presents the empirical model. Section 3 describes the data. Section 4 discusses our main results. Section 5 concludes.

[1] To be more precise, define $D^i(c^i)$ as the demand for pharmaceuticals in region i (for example number of prescriptions) as a function of the co-payment c^i. We expect $dD^i/dc^i \equiv D^i{}_c < 0$: a higher co-payment makes patients and doctors more cost-conscious, which translates into a lower demand. Co-payments are decided by each individual regional authority i. Define p as the price charged by the pharmaceutical industry to provide each unit of pharmaceutical product. The price p is agreed between the central government and the pharmaceutical industry, and therefore does not vary by region. If the regions have the authority to set co-payments, then public pharmaceutical expenditure in region i is equal to $(p-c^i)D^i(c^i)$. A higher co-payment c^i implies a lower public pharmaceutical expenditure as $d((p-c^i)D^i(c^i))/dc^i = -D^i(c^i) + (p-c^i)D^i{}_c < 0$. A higher co-payment reduces the public expenditure sustained by region i as part of the price is now paid directly by the patient (first term), but also reduces the demand for pharmaceuticals which further reduces public expenditure (second term).