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## 11 Prescription drug insurance and reimbursement

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### 1. The gains from insurance

The headlines are familiar: prescription drug expenditures are burgeoning despite higher patient co-payments; many lack insurance to cover the high cost of new life-saving drugs; US drug insurers propose importing lower cost drugs *en masse* from Canada amid warnings from the pharmaceutical industry that research and development would suffer. Far from being solely of academic interest, understanding of the economics of drug insurance and reimbursement affords insights into many interesting policy issues.

To understand the issues, it is instructive to contrast the standard textbook model of the insurance market to the actual market. The expected utility model predicts that risk averse consumers – each facing the same probability  $p$  of a financial loss of  $\$L$  associated with illness – are better off by paying a premium equal to the expected loss,  $\$pL$ , in exchange for compensation of  $\$L$  should they become ill. Consumers' willingness to pay for insurance (net of  $pL$ ) is greater, the more risk averse they are and the greater is the variance of losses (that is, the greater is  $L$  and the closer is  $p$  to 0.5). Hence, consumers' welfare gain from insuring against rare, catastrophic illness ('high variance' losses) exceeds that of insuring routine ailments ('low variance' losses).

The actual insurance market differs in several ways. First, premiums must exceed  $\$pL$  to cover operating costs, including the cost of processing claims. The cost of insuring routine ailments would therefore exceed the cost of insuring catastrophic illness, even if the expected payouts for the two illnesses are identical. In the limit then, as  $p \rightarrow 1$  and  $L \rightarrow 0$ , premiums will exceed consumers' willingness to pay for insurance. Many bio-pharmaceuticals, such as Remicade for rheumatoid arthritis, are both expensive (because of high unit prices and/or the need to take them indefinitely) and used to treat relatively rare disorders, so it is not surprising that drug insurance markets exist. But such drugs have been around only for the last several decades. What is surprising is that drug insurance existed during a time in which the scope for drugs to manage chronic health problems was limited, and drug spending correspondingly low.<sup>1</sup>

The answer is partly due to the tax treatment of employers' health plans for their employees. Drug and other health benefits are usually not taxable, whereas if the value of these benefits were instead paid as wages, they would be taxed. Such plans are therefore particularly valuable for employees facing high marginal tax rates and this raises questions about the distributional equity of this public subsidy. Using variation in tax rates across the provinces of Canada and the 1993 decision by the province of Quebec to begin taxing health benefits, Stabile (2001) and Finkelstein (2002) estimate that the

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elimination of the public subsidy would reduce the uptake of group insurance by about 20 per cent.

## 2. Adverse selection

The employer provision of drug insurance also makes sense when we consider the implications of relaxing another restriction implicit in the standard model, that is all individuals share the same expected loss. In reality, consumers vary in  $p$ ,  $L$  or both  $p$  and  $L$  in ways that are known to consumers but not insurers, making it costly to tailor premiums to individuals' risk. 'Sick' consumers – those whose expected loss exceeds the premium – are more likely to find insurance attractive and hence buy insurance than are the 'healthy' – those whose expected loss is less than the premium. The enrollee pool therefore tends to become dominated by the sick; attempts by insurers to recoup losses by raising premiums only exacerbates the problem as the remaining healthy opt out. Employer provision of drug insurance circumvents the problem by effectively requiring that healthy employees subsidize the premiums of their sick colleagues – those who wish to opt out must find employment elsewhere. Moreover, because insurers need only track total claims for purposes of setting premiums, operating costs are lower.

What are the insurance prospects for those who are not part of an employer (or other) group plan? One possibility is that insurers offer a menu of policies differing in premiums and deductibles. The policies are chosen such that those who expect to use lots of health care prefer the low deductible, high premium policies over the high deductible, low premium policies that the healthy prefer to purchase. In other words, the policies are chosen so that consumers reveal their expected losses by their choice of policy, allowing insurers to tailor coverage to individuals' risk (Rothschild and Stiglitz, 1976).

In this 'separating' equilibrium, information acquisition costs prevent the healthy from obtaining comprehensive coverage. Fortunately for the healthy, however, insurers are becoming increasingly sophisticated at predicting individuals' expected losses (Cawley and Philipson, 1999). For instance, the composition of glucose, enzymes, fats and various antibodies in a blood sample signals the presence of many risk factors.<sup>2</sup> Moreover, most spending is on drugs used to treat chronic conditions, such as elevated blood fat (hyperlipidemia) and pressure (hypertension), arthritis and depression (Morgan, 2004). Hence a patient's drug use history is an excellent predictor of future expenses (Coulson and Stuart, 1992); Pauly and Zeng (2003) note that drug use is among the most autocorrelated of all health services. Nevertheless, risk signalling is not costless: following Quebec's decision to tax health benefits, only 15 per cent of those who had lost employer coverage eventually acquired non-group coverage (Finkelstein, 2002).

The ability of insurers to predict risk is bad news for the sick: the actuarially fair premium for some will exceed their ability to pay. This raises the public policy question: should their premiums (or drug costs) be subsidized? The fact that many countries provide subsidies to those for whom drugs often constitute a large share of income – the aged and the indigent – suggests that equity concerns are important.<sup>3</sup> A prominent case in point is the recent decision to allocate \$724 billion to extend drug subsidies to US seniors, only about half of whom have stable coverage (Pear, 2005; Reinhardt, 2001).

The targeting of subsidies on the basis of age (typically age 65+) raises questions of the incidence of the subsidy: are subsidies benefiting primarily low income seniors?

Alan et al. (2002) report that the introduction of Canadian provincial drug plans for seniors produced the largest benefits for the most affluent. Anecdotal evidence from drug plan managers suggests that higher income seniors are better able to get physicians to prescribe the latest drugs. In contrast to subsidies targeted at seniors, publicly funded catastrophic (large deductible) drug insurance for those under 65 appears to be mildly progressive (Alan et al., 2005). Apparently, the introduction of such subsidies has no impact on higher income households, who usually already have similar or better employer coverage, but represents an increase in coverage for lower income households who previously had little or no insurance.

### 3. Moral hazard

A third restriction inherent in the standard model is that insurers can costlessly observe individuals' health and compensate claimants with lump-sum payouts  $L$ . If monitoring health is costly, however, insurers might instead reimburse drug expenditures (see Chapter 10 by Geoffard in this Companion). But reimbursement insurance, unlike lump-sum insurance, changes relative prices. Just as a fire insurance policy that covered the cost of a replacement home would increase demand for luxury homes, drug insurance increases demand for relatively expensive therapies.

Early treatments of this 'moral hazard' phenomenon emphasized the consumer-patient's role in driving up drug costs. Essentially, the price that the fully insured consumer faces for drugs is zero, prompting the consumer to expend less effort in illness or injury prevention (increasing  $p$ ) and to 'demand' more drugs if ill (increasing  $L$ ) compared to his non-insured counterparts. But the value of the additional drugs used is less than its resource cost, resulting in welfare loss (Pauly, 1968). Patient 'cost sharing' could help. The optimal patient charge would balance the benefits of insurance (in terms of risk reduction) against its cost (in terms of excessive drug use). A corollary is that the optimal patient charge is proportional to the price elasticity of drug use ( $\eta$ ); if drug use does not depend on price (that is one's insurance status), then drugs should be fully insured (Zeckhauser, 1970).

Subsequent analysts, while not denying that patient-initiated moral hazard exists, emphasized the dominant role of the physician in diagnosis and treatment decisions. Patients, left to their own devices, might make serious mistakes. Therefore, most insured drugs can be used only with physician consent – hence the name 'prescription' drugs. This analysis yielded two insights. First, if patients have poor information about the properties of their drugs, an increase in patient charges may not lead them to relinquish selectively those drugs with the smallest expected health impact; hence patient charges might not necessarily be welfare improving.<sup>4</sup> Second, physician-initiated moral hazard might be as important as the patient-initiated variety. Because the physician treats drugs as a free input, she will select drugs based on perceived effectiveness or ease of use, not cost. Moreover, she might substitute drugs for her own time and other costly inputs. Indeed, prescribing rates and time spent per patient are negatively correlated (Davidson et al., 1994). If the patient is required to pay part of the drug cost and if the patient is cost conscious, the physician may be more likely to take drug cost into account. Nevertheless, attempts to curb moral hazard solely by targeting patients are likely to be ineffective, given the amount of physician influence in treatment decisions.

Nyman (Chapter 9 in this Companion) has further questioned the normative basis for evaluating the gains from insurance. The difference in drug costs incurred by the fully insured patient and what the patient would have purchased without insurance is, according to the standard model, undesirable. To be sure, some of this difference reflects the selection of substitutable drugs on the basis of perceived effectiveness or ease of use, regardless of cost. But some of this difference is also due to the income transfer to the insured ill patient, implicit in the reduction in drug prices, which makes the purchase of any of the substitutable drugs more affordable. This component of the difference, which presumably *is* desirable, would be likely to dominate if the drugs in question are costly.

Reimbursement insurance affects more than just the treatment choices of patients and physicians. Drug developers are more likely to introduce new drugs and charge more for them if end users do not bear the cost. As long as a new drug offers the slightest therapeutic advantage over existing drugs, it makes sense for fully insured patients to use it. The scope for drugs to treat health problems, and therefore the size of  $L$ , is likely to depend on the generosity of drug insurance. Scherer (2001) provides evidence consistent with this conjecture.

#### *Pre-payment schemes*

How could insurers combat moral hazard? In theory, insurers and physicians could agree on a treatment plan for every possible illness. Insurers would then pay out a lump sum  $L$  to cover the cost of these treatments should illness strike. In practice, this approach is difficult to implement. First, the contract would need to cover a very large number of contingencies due to the sheer number of different illnesses, differences in illness severity and progression, and uncertainties in diagnosis. Second, the physician could misrepresent the nature of the illness for financial gain. Finally, the contract would need to be renegotiated if there were material changes in medical technology or prices. To implement this approach, the gains from insurance would need to be sufficiently large so as to outweigh large transactions costs. That is perhaps why the system has been used to insure high variance losses, such as hospital care (the US Medicare programme introduced this approach in 1983 to pay for hospital care for its beneficiaries), but is not commonly used to insure drugs.

One way to circumvent the difficulties of negotiating illness-specific payouts is to give the physician (or other health provider) a budget with which to treat a group of patients for any illness that may arise over a period of time. At the end of the period, the physician keeps whatever money is left over (the 'residual'). The physician would therefore have an incentive to treat patients using the least costly mix of drug and other health services. While a promising approach, the potential problems are well known: physicians are likely to require additional compensation to accept income risk (the residual might be negative if their patients are atypically sick); physicians might 'cream-skim' (that is drop patients whose anticipated treatment costs exceed budgeted amounts); and physicians might reduce quality if it is difficult to distinguish low quality from 'bad luck' and/or if patient turnover is high (see Chapter 25 by Iverson and Lurås in this Companion). Prospective payment schemes of this sort are used in the US in the context of health maintenance organizations (HMOs) and in the UK in the context of general practitioner (GP) fundholding. Gosden and Torgerson (1997), in a review of the literature, report that

fundholding appears to make GPs more cost conscious prescribers, a result corroborated by Domino and Salkever (2003) for US Medicaid HMOs. Little is known, however, about the attendant effects on the quality of care provided.

#### *Schemes to affect prescribing behaviour*

Physicians often have a choice of drugs to treat a given illness. For instance, diuretics, angiotensin converting enzyme inhibitors (ACEIs) and calcium channel blockers (CCBs) all manage uncomplicated hypertension. Diuretics are at least as effective as ACEIs and CCBs but are a fraction of the cost.<sup>5</sup> However, only 40 per cent of elderly beneficiaries of Pharmacare, the public drug plan for seniors and others in British Columbia (BC), Canada, receive diuretics as first line therapy for hypertension (Maclure et al., 1998). In an attempt to get physicians to become more cost conscious prescribers, drug insurers have used regulation, education, and in France, financial penalties for failure to prescribe according to guidelines.

A common regulatory tool is 'prior authorization' (PA) – the requirement that physicians justify why an expensive drug is required when cheaper alternatives exist. The evidence suggests that financial penalty and PA schemes change prescribing patterns and save money (Durand-Zaleski et al., 1997; Lexchin, 2002). For instance, Vioxx and Celebrex, introduced in 1999, are two selective cyclooxygenase-2 inhibitors (coxibs) used to manage arthritis pain and inflammation.<sup>6</sup> They are purported to have less gastrointestinal toxicity compared to conventional analgesics, but are also more costly. The 22 US state Medicaid drug plans that implemented PA programmes for the coxibs during the period 1999–2003 reduced cost per analgesic prescription by about 20 per cent (Fischer et al., 2004). While they can save money, PA schemes might reduce patient access to beneficial drugs, and annoy doctors especially when the requirements for documentation are onerous and the appeals process cumbersome. The evidence on patient health impacts, while limited, suggests that these prescribing restrictions are largely innocuous (Lexchin, 2002).

Insurers have had much less success with educational initiatives targeted at prescribers. Unsolicited print materials and academic conferences without personalized attention simply don't work. However, interventions in which some effort is made to determine practice needs or to facilitate practice change can have a modest effect on prescribing and to a lesser extent, patient health (Oxman et al., 1995). In short, one can teach an old doc new tricks, but it's hard.

#### *Patient cost sharing*

The third method used to reduce drug costs – patient cost sharing – is ubiquitous. A variety of forms of cost sharing have emerged, including co-payment (a fixed fee per prescription), co-insurance (a proportion of ingredient cost and/or dispensing fee) and charges which vary with the number of prescriptions filled (for example deductibles and limits on total payouts). Patient charges also vary by drug. For instance, some insurers refuse to cover so-called 'lifestyle' drugs, such as drugs for erectile dysfunction. This amounts to 100 per cent co-insurance. Many public drug plans, such as those in Ontario (Ontario Ministry of Health, 1994) and Australia (Commonwealth of Australia, 1995), refuse to cover new drugs that do not offer sufficient therapeutic or cost advantages

compared to existing therapies.<sup>7</sup> Alternatively, the insurer might provide more generous coverage to cheaper drugs within a drug class. For example, an insurer might limit reimbursement of branded and generic versions of the same drug to the price of the cheapest generic; any cost above that is borne by the patient. These product selection restrictions are commonplace. Less common are 'reference pricing' schemes wherein the insurer limits reimbursement of therapeutically similar, although chemically different drugs. For example, BC Pharmacare limits reimbursement of the 10 different ACEIs to about \$30/month. At this price, cheaper ACEIs are fully reimbursed; dearer ACEIs require patient contributions.<sup>8</sup> A variant of reference pricing is tiered cost sharing. Among private US insurers, drugs in the top tier typically require a \$30 co-payment for a month's supply, whereas bottom tier generic drugs usually require a \$5 co-payment (Gleason et al., 2005).

In addition to a money cost, consumers must pay a time cost for insured drugs. Traditionally this involved filling out forms and mailing these, along with receipts, to the insurer for reimbursement. Now most claims are processed electronically, at point of sale. This reduction in time cost had a remarkably large effect on drug use in BC (Grootendorst, 2005).

Most of the empirical evidence on the effects of traditional patient cost sharing on prescription drug use comes from observational studies of patient charges imposed by public drug plans in Canada, the US and UK, as well as within US HMOs. The evidence suggests that for most individuals, modest charges have a less than proportional effect on drug use:  $\eta$  is likely between  $-0.1$  to  $-0.3$  (Smith and Kirking, 1992; Gerdtham and Johannesson, 1996). The small response could reflect small income effects, limited substitution opportunities or high marginal valuation of health. The small response could also reflect patient adaptation to the cost sharing scheme. For instance, when faced with a co-payment, patients can economize by filling fewer, but larger prescriptions. Patients can mitigate the effects of dispensing fee co-insurance by patronizing mail order pharmacies and other low cost retailers (Berndt, 2002). If deductibles are used, once the deductible has been reached, drugs become free of charge. Ellis (1986) demonstrated that a forward-looking patient who expects to exceed the deductible would treat the marginal cost of all drugs used as zero – the deductible then affects drug use only through an income effect. Contoyannis et al. (2004) provide empirical evidence supporting this model.

Not surprisingly,  $\eta$  is larger for individuals who spend a larger share of their budgets on drugs – the sick poor (Lexchin and Grootendorst, 2004; Adams et al., 2001). For instance, the imposition of a limit of three reimbursed prescriptions per month by the New Hampshire Medicaid programme resulted in a 30 per cent reduction in the mean number of drugs used by (low income) schizophrenics (Soumerai et al., 1987). Proportionate reductions in drug use were even larger (46 per cent) in the sub-sample of multiple drug users. Depriving indigent schizophrenics of their medicines reduced Medicaid's drug bill by \$5 per person per month, but this was offset by increased use of other health services: overall expenditures increased by \$139 per month (Soumerai et al., 1994).

The health impacts of cost sharing depend on the price elasticity of drug use, the effectiveness of the drugs whose use is being deterred by the cost sharing and whether the drugs were used appropriately to begin with. This is illustrated by the analyses of the large cost sharing changes in the Quebec public drug plan. Prior to August 1996, all but the

lowest income seniors paid a \$2 co-payment (up to a \$100 annual maximum). After this time seniors paid income-contingent premiums of \$0–\$175, and faced monthly deductibles of \$8.33, with 25 per cent co-insurance, subject to income-contingent monthly maximums (from \$16.67 to \$62.50). Consistent with the literature, these sharp increases in charges did not result in particularly large drops in drug use: use of essential, life-saving medications (such as insulin, thyroid and anti-hypertensive drugs) dropped only 9 per cent, while use of less essential medications dropped 15 per cent. The relatively modest decline in essential drug use, however, resulted in substantially higher adverse event rates, including a 117 per cent increase in hospitalizations and doctors' visits and a 77 per cent increase in emergency department visits. Decreases in use of less essential drugs, on the other hand, did not result in such adverse events. Moreover, the relatively modest increases in charges targeted at welfare recipients produced larger proportionate reductions in drug use than observed for seniors and had comparable percentage increases in adverse event rates, even though the baseline adverse events rates were over double those for seniors (Tamblyn et al., 2001).

In contrast, Blais et al. (1999) found no adverse health impacts from the same charges applied to low income Quebec asthmatics. While asthma medications are usually deemed 'essential', these medications are known to be used inappropriately (Anis et al., 2001) so that reduced use would not be likely to affect health. Moreover, Blais et al. (2001) and Pilote et al. (2002) report that Quebec seniors' use of cardiac drugs and associated health outcomes were unaffected by the increase in patient charges; hence drugs used to treat more life threatening conditions appear less price sensitive.

Unlike conventional patient charges, reference pricing fully subsidizes lower cost medicines and, for those who meet exemption criteria, higher cost medicines as well. Reference pricing might therefore save money while avoiding the adverse patient health impacts associated with schemes that charge patients for all drugs. The most definitive evidence comes from the reference pricing programme introduced by BC Pharmacare, owing to the availability of patient-level drug and health services claims and health indicators data. Analyses of the impact of reference pricing applied to the ACEIs, CCBs and H<sub>2</sub>-blockers suggest that drug plan savings were more than large enough to cover additional administrative costs (Schneeweiss et al., 2002, 2003, 2004; Hazlet and Blough, 2002; Grootendorst et al., 2002).<sup>9</sup> No deleterious effects on patient health were observed, although the health indicators – which are based on hospital admissions and mortality data – are likely to be insensitive to subtler changes in patient health related quality of life.

#### *Drug price discounts*

Drug manufacturers are able to exercise some market power owing to patent protection, differentiated products and/or price insensitive patients and prescribers. This has not gone unnoticed by drug insurers. Many large drug purchasers, such as the Australian national drug insurance scheme and US HMOs secure price discounts in exchange for formulary listing (Wright, 2004; Scherer, 2000, p. 1325). Not wanting to miss out on the action, the US Medicaid drug programme in 1993 demanded a 15 per cent discount off average wholesale prices, or access to the lowest price paid by any other purchaser in the US, whichever is greater. Although Medicaid initially enjoyed a windfall gain, manufacturers eventually

responded by increasing wholesale prices and reducing discounts (Congressional Budget Office, 1996), much to the chagrin of private insurers.<sup>10</sup>

Demands by insurers that they receive the best available price, although understandable, might reduce collective welfare in so far as they force drug manufacturers to charge identical prices to customers with different degrees of price sensitivity. For instance, if the US were to legalize drug imports from Canada, where drugs are cheaper in part because of lower incomes (Danzon and Furukawa, 2004), firms would eventually increase Canadian prices to US levels to stem the cross-border trade and thereby secure profits in the large US market. This would reduce both manufacturers' rents (and possibly R&D) and consumer surplus in the Canadian market.<sup>11</sup>

#### 4. Concluding comments

Prescription drug insurance schemes offer examples of how institutions have evolved to deal with the problems encountered with the provision of health insurance, namely adverse selection, moral hazard and the plight of the sick poor. Drug insurance is unique, however, in that institutional responses interacts with the pharmaceutical industry in ways that encourage or discourage technological development. The widespread adoption of reference pricing and schemes that reward drugs based on their productivity, such as those proposed by Hollis (2005), would dramatically reduce the payoff to drugs which offer only minor therapeutic advantages over incumbents, the so-called 'me-too' drugs. Conversely, attempts by drug payers to constrain prices on therapeutically novel 'blockbuster' drugs might inhibit the development of novel therapies, as sales from blockbusters have to repay the losses on the majority of drugs that don't even earn their capitalized R&D costs (Scherer, 2000, p. 1316).

Drug innovation might also affect drug insurance schemes. The continued development of costly biological drugs might make previously untreatable diseases treatable, or at least manageable, and hence create demand for insurance. Advances in genetic testing will make it easier to predict who will suffer losses in the future. Should this information be privileged, then adverse selection is likely to result. Conversely, if this information is public, this will limit the potential for risk pooling and exacerbate disparities in drug insurance coverage.

#### Notes

1. Berndt (2002, Table 2) reports that as the scope for drugs to treat problems has increased, so has the US drug insurers' share of prescription drug costs. The insurers' share increased from 3.5 per cent in 1965 to 73.4 per cent in 1998.
2. See, for example, <http://www.amarillomed.com/howto.htm>.
3. Equity concerns are not likely to be the only argument for public drug subsidies. If it were, then most developed countries would presumably have about the same public sector share of total drug spending. But this share varies markedly among OECD countries, from a low of 19 per cent (US) to a high of 94 per cent (Ireland) (OECD, 2004). It is also unlikely that this public subsidy variation is due to differences in externalities generated by the under-use of drugs that prevent the spread of infectious disease.
4. Evans (2002, page 25) also questions the normative basis for evaluating the welfare gains of health service use: 'In this technical meaning of "efficiency", the use of health care (or any other commodity) by people who are "unwilling" – which includes unable – to pay for it, is defined as "inefficient" regardless of the needs of the person or the effectiveness of the care. Conversely, use of care that is ineffective or even harmful by persons who are willing to pay for it (strikingly, even if they do not actually pay!) is defined as "efficient".'



5. For evidence on the efficacy of diuretics, ACEIs and CCBs, see: ALLHAT Officers and Coordinators for the ALLHAT Collaborative Research Group. The Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (2002). The BC Therapeutics Initiative estimates the cost of 10 years' therapy (excluding dispensing fees) at maximum doses of a diuretic to be \$37 – substantially less than the cost of an ACEI (\$7139) or a CCB (\$7420). See <http://www.ti.ubc.ca/pages/letter47.htm>
6. Vioxx was withdrawn from the market in September 2004 over cardiovascular safety concerns.
7. The prerequisite for the reimbursement of new drugs – evidence that they offer value for money – has spawned the field of 'pharmacoeconomics', the application of the tools of economic appraisal to new drugs (Drummond, Chapter 50 in this Companion). This area is ubiquitous, so many in the medical community consider 'health economics' and 'pharmacoeconomics' to be one and the same. Reinhardt (2001, 2004) has advocated that the US National Institutes of Health fund pharmacoeconomic analyses to guide reimbursement decisions.
8. Similar reimbursement limits have been applied to the CCBs, nitrates, H2-blockers and NSAIDs. See <http://www.healthservices.gov.bc.ca/pharme/sa/criteria/rdpcategoriesindex.html>. Reference pricing and the use of pharmacoeconomic analyses to determine insurer reimbursement of medicines can be thought of as special cases of a reward system in which more productive drugs earn a larger share of a fixed reward fund (Hollis, 2005).
9. For literature reviews, see Lopez-Casasnovas and Puig-Junoy (2000) and Kanavos and Reinhardt (2003).
10. There are many other examples of externalities created by drug insurance: restrictions on the drugs reimbursed by large public insurers can reduce costs to private drug plans because of their durable influence on physician prescribing patterns (Wang et al., 2003). Conversely, a physician who is forced to keep track of the myriad formulary restrictions of all her patients might simply follow her own prescribing preferences (Berndt, 2002). Similarly, increases in the number of drug insurers increase the complexity of sorting out insurance claims (Reinhardt et al., 2004). The tax subsidies offered to private drug insurance can increase the number of physician visits because prescription drug use and physician visits are complements (Stabile, 2001). Conversely, the use of some prescription drugs can substitute for more costly hospitalization (Lichtenberg, 1996). (But see also Duggan (2005).) Insurance coverage of vaccinations and drugs that inhibit the spread of infectious disease will generate external benefits. Conversely, generous insurance of antibiotics might increase their use and propagate resistant strains of bacteria (Horowitz and Moehring, 2004). Widespread use of a particular drug might convey information about efficacy and safety to other patients and physicians. This can lead to dominance of one drug despite the availability of close substitutes (Berndt et al., 2003). Finally, expansions of public insurance designed to help the uninsured will also attract those who already have private insurance (Cutler and Gruber, 1996).
11. The parallel trade in pharmaceuticals in the European Union has also led to drug companies 'withholding or delaying launch of new products in traditional low-price countries of the EU, rather than accept prices that would invite parallel trade and hence erode the prices that they can earn in other larger markets.' (Danzon, 1998, p. 300).

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