When Discounts Raise Costs: The Effect of Copay Coupons on Generic Utilization

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Online Appendix

1 Formal coupon analysis

In this section, we present a stylized formal model to illustrate the effect of coupons on behavior, emphasizing the incentives generated by insurance. Throughout, we assume that a bioequivalent generic for the branded drug is available and is produced by several generic firms. We further assume that the generic firms produce undifferentiated products and price at marginal cost. This assumption, which is consistent with evidence on generic pricing,[1] allows us to abstract away from any strategic interactions between brand and generic pricing.

1.1 Pricing without coupons

Consider a brand-name pharmaceutical manufacturer (without the ability to offer copay coupons) setting the price p of its drug to an insurer. While the manufacturer receives p for every prescription filled, the price that determines demand is not p itself. Rather, insured consumers pay only $m(p)$ for a prescription, where $m(\cdot)$ is a function chosen by the insurer. The price facing consumers — $m(p)$ — is what determines demand rather than p directly. In practice, $m(\cdot)$ typically consists of several tiers of copayments, but for the purposes of the analysis here, we will assume that $m(\cdot)$ is a smooth, differentiable function of p.

To get a sense of what $m(p)$ looks like in the data, Figure 1 plots consumer out-of-pocket cost and total (insurer plus consumer) payments for privately insured consumers in the Medical Expenditure Panel Survey (MEPS) from 2005 to 2012. Based on the pattern in Figure 1, we make the following three assumptions about $m(\cdot)$ in the subsequent analysis:

1. $m(0) = 0$ and $m(p) < p$ for all $p > 0$ (insurance)
2. $m'(p) > 0$ for all p (increasing absolute cost sharing)
3. $m''(p) < 0$ for all p (decreasing proportional cost sharing)

Suppose there is a mass of consumers (normalized to 1) with unit demand who choose between the branded drug and a bioequivalent generic.[2] The proportion of consumers choosing the branded drug is given by demand curve $Q(\cdot)$, while the remaining $1-Q(\cdot)$ consumers

[1] For example, Berndt, McGuire and Newhouse (2011) note that generic prices eventually fall close to typical estimates of marginal cost, a result that is consistent with perfectly competitive markets.

[2] The analysis here assumes away quantity effects; in principle coupons could also generate sales through cross-drug substitution or by reducing non-adherence.

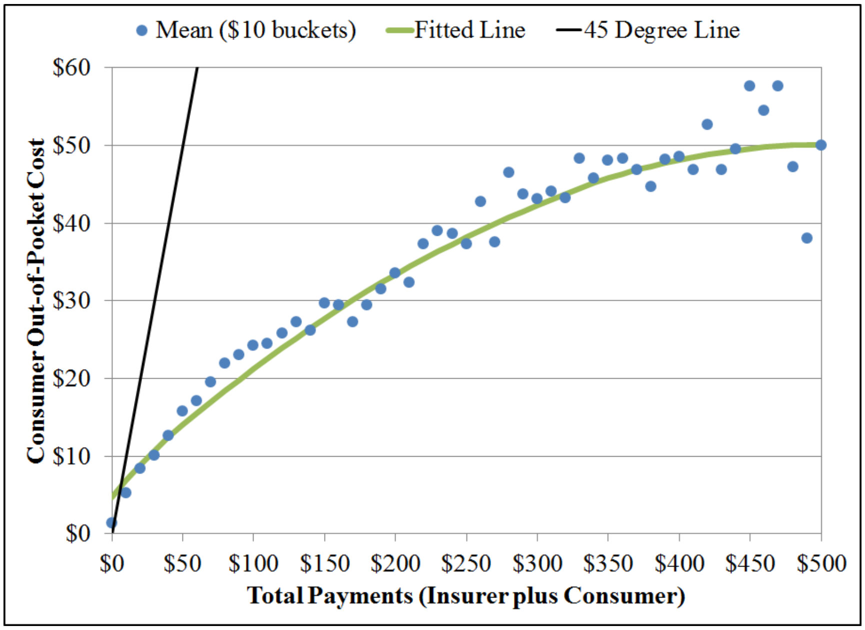

Figure 1: MEPS Expected Out-of-Pocket Costs, 2005–2012 All numbers are measured in CPI-adjusted 2010 dollars. Total payments are censored from above at $500 — 97 percent of prescriptions in the data have total payments of less than $500. The points are averages within $10 buckets, and the fitted line is a locally weighted scatterplot smoothing (lowess) line through the points.

buy generic (generic efficiency). Given (constant) marginal cost c, the manufacturer chooses price to maximize profits:

$$\max_{p} \ (p-c)\cdot Q\big(m(p)\big). \tag{1}$$

The difference between (1) and the standard profit-maximization problem is that, due to the presence of insurance, the price received by the manufacturer is not the same price that determines demand. (If there is no insurance, $m(p) = p$ and (1) reduces to the standard profit-maximization problem.) Further assume that $Q' < 0$ and $Q'' \leq 0$, which are sufficient conditions to guarantee that the manufacturer's profit function is concave.

Given the assumptions made on $m(\cdot)$ and $Q(\cdot)$, it can be shown that the manufacturer's optimal price when facing insured consumers is higher than the optimal price without insurance. Intuitively, the cost to the manufacturer of increasing price — lower quantity — is dampened by the presence of insurance, which passes through price increases to consumers at less than a 1:1 rate. The manufacturer optimally responds by increasing price beyond the optimal price in the absence of insurance (a similar result is shown in Berndt, McGuire and Newhouse (2011)).

1.2 Adding coupons

Suppose now that the manufacturer is able to offer consumers a coupon which reduces their out-of-pocket cost by $z \in \big[0, m(p)\big]$. Further assume that all consumers who buy the branded drug use the coupon. This simplifying assumption — though unlikely to be true in practice — enables us to focus on the interaction between coupons and the insurer copayment mechanism rather than other rationales for coupons such as price discrimination. With coupons, the manufacturer's problem becomes

$$\max_{(p,z)} \ \big(p - z - c\big) \cdot Q\big(m(p) - z\big). \tag{2}$$

Unlike p, which is dampened by $m(\cdot)$, the coupon z reaches consumers directly. We derive three specific propositions with regard to the effects of coupons on behavior. Here we present the intuition and interpretation of the predictions; the proofs follow in the next section.

Proposition 1. *Suppose that the manufacturer is constrained to price no higher than $\bar{P}$ (i.e., $p \in [0, \bar{P}]$).*[3] *When coupons are allowed, the manufacturer's optimal price is $p^* = \bar{P}$.*

Proposition 1 states that, holding $m(\cdot)$ fixed, coupons undermine the efficacy of copays in limiting prices. No matter how high $\bar{P}$ is, the manufacturer optimally prices at the maximum. In essence, the addition of coupons creates a money tree for the manufacturer. By increasing both p and z by the same amount, for instance, the manufacturer can hold its margin constant while simultaneously reducing consumers' out-of-pocket cost, thereby increasing quantity sold.[4] Of course, insurers are unlikely to leave $m(\cdot)$ unchanged as they see their costs skyrocket. Proposition 1 is therefore best interpreted as explaining why copay coupons undermine standard copayment systems. The existing copayment rule $m(\cdot)$ is no longer suitable when manufacturers are able to offer coupons.

Proposition 2. *Denote the manufacturer's optimal price without coupons ($z = 0$) by $\hat{p}$, and let $\bar{P} \geq \hat{p}$. When coupons are allowed, the manufacturer (a) offers a coupon ($z^* > 0$), (b) consumers' out-of-pocket cost is lower (i.e., $m(p^*) - z^* < m(\hat{p})$), and (c) generic efficiency is lower.*

By Proposition 1, we know that the manufacturer's optimal price is $p^* = \bar{P}$. Given a coupon that leaves out-of-pocket cost unchanged from the situation without coupons, $z = m(\bar{P}) - m(\hat{p})$, it can be shown that the manufacturer still has an incentive to increase the value of the coupon. Intuitively, at out-of-pocket cost $m(\hat{p})$, demand is relatively elastic but price reductions are not profitable because the pass-through from price to out-of-pocket cost is imperfect. Since coupons reach consumers directly, however, the manufacturer can induce the same increase in quantity as any price cut but with a smaller effect on the margin. Part (c) of the proposition follows directly from part (b): since coupons decrease consumers' out-of-pocket cost for the branded drug, they lead to an increase in the quantity consumed of the branded drug.

Proposition 3. *Again denote the manufacturer's optimal price without coupons by $\hat{p}$, and let $\bar{P} \geq \hat{p}$. Further assume that generic marginal cost c_g is weakly less than brand marginal*

[3] The price cap $\bar{P}$ can be interpreted as a choke price beyond which the insurer drops the drug from the formulary.

[4] This intuition is not complete because of boundary cases, but the basic idea is correct.

cost, i.e., $c_g \leq c$. When coupons are allowed, total spending (insurer plus consumer) is higher.

Proposition 3 contains the final prediction about the effects of coupons that we study in the empirical analysis in the text — total spending increases as a result of coupons. Whether coupons increase total spending depends crucially on the price of available substitutes (in this case, a bioequivalent generic). A sufficient — albeit not necessary — condition for total spending to increase is weakly lower generic marginal costs, together with a competitive generic market where generics price at marginal cost. More generally, as long as the gap between the brand's price net of the coupon ($p^* - z^*$) and the generic price is large, which is true in practice, total spending will tend to increase with the addition of coupons.

1.3 Proofs

Proposition (unnumbered): The manufacturer's optimal price when facing insured consumers is higher than the optimal price without insurance.

Proof: Denote the manufacturer's optimal price when consumers are uninsured by $\tilde{p}$. Writing out the derivative of manufacturer profit when consumers are insured ($\partial\pi/\partial p$) with respect to price, evaluated at $\tilde{p}$:

$$\begin{aligned}\frac{\partial \pi}{\partial p}\big(\tilde{p}\big) &= Q\big(m(\tilde{p})\big) + \big(\tilde{p} - c\big) \cdot Q'\big(m(\tilde{p})\big) \cdot m'(\tilde{p}) \\ &> Q\big(\tilde{p}\big) + \big(\tilde{p} - c\big) \cdot Q'\big(\tilde{p}\big) \\ &= 0\end{aligned}$$

The equality at the end follows by the definition of $\tilde{p}$ as the optimal price facing uninsured consumers. The inequality follows because:

- $Q\big(m(\tilde{p})\big) > Q\big(\tilde{p}\big)$ (since Q is decreasing and $\tilde{p} > m(\tilde{p})$)
- $Q'\big(m(\tilde{p})\big) \cdot m'(\tilde{p}) > Q'\big(\tilde{p}\big)$ (since $Q' < 0$, $m'(\tilde{p}) < 1$, and $Q'\big(m(\tilde{p})\big) > Q'\big(\tilde{p}\big)$ because Q' is decreasing)[5]

Therefore, the manufacturer facing insured consumers benefits from increasing price beyond the optimal price when facing uninsured consumers. □

Proposition 1: Suppose that the manufacturer is constrained to price no higher than $\bar{P}$ (i.e. $p \in [0, \bar{P}]$). When coupons are allowed, the manufacturer's optimal price is $p^* = \bar{P}$.

Proof: Suppose the optimal price/coupon pair is given by (p, z), with $p < \bar{P}$. Now consider the alternative pair $(p', z') = \big(\bar{P}, \min(z + \bar{P} - p, m(\bar{P}))\big)$. We will show that (p', z') yields higher profits and thus (p, z) cannot be optimal.

[5] To see that $m'(\tilde{p}) < 1$, note that $m'(0) = \lim_{\Delta \to 0} \frac{m(\Delta) - m(0)}{\Delta} = \lim_{\Delta \to 0} \frac{m(\Delta)}{\Delta} < \lim_{\Delta \to 0} \frac{\Delta}{\Delta} = 1$. $m'(p) < 1$ for all $p > 0$ then follows because m' is decreasing.

Suppose that $z + \bar{P} - p \le m(\bar{P})$. Profits from (p', z') are given by:

$$\begin{aligned}\pi(p', z') &= (\bar{P} - z - \bar{P} + p - c) \cdot Q\big(m(\bar{P}) - z - \bar{P} + p\big) \\ &= (p - z - c) \cdot Q\big(m(\bar{P}) - z - \bar{P} + p\big)\end{aligned}$$

The margin above is the same as for (p, z). Therefore profits are higher under (p', z') if quantity is higher, or equivalently if consumer out-of-pocket cost is lower. Consumer out-of-pocket cost is lower if $m(\bar{P}) - z - \bar{P} + p < m(p) - z$. Rearranging, this holds if $\bar{P} - m(\bar{P}) > p - m(p)$, which is true because m is concave.

Now suppose instead that $m(\bar{P}) < z + \bar{P} - p$. Profits from (p', z') are given by:

$$\pi(p', z') = \big(\bar{P} - m(\bar{P}) - c\big) \cdot Q(0)$$

Quantity can be no higher than $Q(0)$ under (p, z), so profits will be higher under (p', z') if the margin is higher. The margin is higher if $\bar{P} - m(\bar{P}) - c > p - z - c$. Rearranging, this holds if $m(\bar{P}) < z + \bar{P} - p$, which is exactly what we started with. □

Proposition 2: Denote the manufacturer's optimal price without coupons ($z = 0$) by $\hat{p}$, and let $\bar{P} \ge \hat{p}$. When coupons are allowed, the manufacturer (a) offers a coupon ($z^* > 0$), (b) consumers' out-of-pocket cost is lower (i.e. $m(p^*) - z^* < m(\hat{p})$), and (c) generic efficiency is lower.

Proof: By Proposition 1, we know that the manufacturer's optimal price is $p^* = \bar{P}$. Now take a coupon that leaves consumer out-of-pocket cost unchanged from the situation without coupons, $z = m(\bar{P}) - m(\hat{p}) \ge 0$. We will show that $\frac{\partial \pi}{\partial z}\big(\bar{P}, m(\bar{P}) - m(\hat{p})\big) > 0$, so the manufacturer would like to further increase the value of the coupon.

$$\begin{aligned}\frac{\partial \pi}{\partial z}\big(\bar{P}, m(\bar{P}) - m(\hat{p})\big) &= -Q\big(m(\hat{p})\big) - \big(\bar{P} - m(\bar{P}) + m(\hat{p}) - c\big) \cdot Q'\big(m(\hat{p})\big) \\ &\ge -Q\big(m(\hat{p})\big) - \big(\hat{p} - c\big) \cdot Q'\big(m(\hat{p})\big) \\ &> -Q\big(m(\hat{p})\big) - \big(\hat{p} - c\big) \cdot Q'\big(m(\hat{p})\big) \cdot m'(\hat{p}) \\ &= -1 \cdot \Big[Q\big(m(\hat{p})\big) + \big(\hat{p} - c\big) \cdot Q'\big(m(\hat{p})\big) \cdot m'(\hat{p})\Big] \\ &= 0\end{aligned}$$

The first inequality follows because $\bar{P} - m(\bar{P}) \ge \hat{p} - m(\hat{p})$ (since m is concave and $\bar{P} \ge \hat{p}$). The second inequality follows because $m'(\hat{p}) < 1$. The last equality holds because the expression inside the brackets on the line before is the derivative of profits with respect to price when coupons are not allowed, and since $\hat{p}$ is optimal when coupons are not allowed, this expression is equal to zero. Therefore, the optimal coupon value z^* is greater than $m(\bar{P}) - m(\hat{p}) \ge 0$, which implies that consumer out-of-pocket spending is lower than without coupons because $m(\bar{P}) - z^* < m(\bar{P}) - m(\bar{P}) + m(\hat{p}) = m(\hat{p})$. Part (c) follows immediately from part (b) and the fact that Q is decreasing in out-of-pocket cost. □

Proposition 3: Again denote the manufacturer's optimal price without coupons by $\hat{p}$, and let $\bar{P} \geq \hat{p}$. Further assume that generic marginal cost c_g is weakly less than brand marginal cost, i.e. $c_g \leq c$. When coupons are allowed, total spending (insurer plus consumer) is higher.

Proof: Denote the optimal price/coupon pair with coupons by (p^*, z^*) and the optimal pair without coupons by $(\hat{p}, 0)$. The difference between total spending with coupons and without coupons is given by:

$$\Bigg(\underbrace{\big(p^* - z^*\big) \cdot Q\big(m(p^*) - z^*\big) + c_g \cdot \Big[1 - Q\big(m(p^*) - z^*\big)\Big]}_{\text{spending with coupons}}\Bigg) - \Bigg(\underbrace{\hat{p} \cdot Q\big(m(\hat{p})\big) + c_g \cdot \Big[1 - Q\big(m(\hat{p})\big)\Big]}_{\text{spending without coupons}}\Bigg)$$

Rearranging:

$$\begin{aligned}
&\big(p^* - z^*\big) \cdot Q\big(m(p^*) - z^*\big) - \hat{p} \cdot Q\big(m(\hat{p})\big) - c_g \cdot \Big[Q\big(m(p^*) - z^*\big) - Q\big(m(\hat{p})\big)\Big] \\
&\geq \big(p^* - z^*\big) \cdot Q\big(m(p^*) - z^*\big) - \hat{p} \cdot Q\big(m(\hat{p})\big) - c \cdot \Big[Q\big(m(p^*) - z^*\big) - Q\big(m(\hat{p})\big)\Big] \\
&= \big(p^* - z^* - c\big) \cdot Q\big(m(p^*) - z^*\big) - \big(\hat{p} - c\big) \cdot Q\big(m(\hat{p})\big) \\
&\geq 0
\end{aligned}$$

The first inequality follows because $Q\big(m(p^*) - z^*\big) > Q\big(m(\hat{p})\big)$ (by Proposition 2) and $c_g \leq c$. The expression following the equal sign is the difference between manufacturer profits with coupons and manufacturer profits without coupons. This difference is at least weakly positive because $(\hat{p}, 0)$ is a feasible choice for the manufacturer in the problem with coupons. $\square$

2 Data construction details

This section provides additional information about the steps we take to go from the raw data to the dataset used to perform the analyses discussed in the main text. For further information beyond what we describe here, please feel free to contact any of us with questions.

2.1 Coupon Data (www.internetdrugcoupons.com)

Figure 2 displays an example of the content available on the internetdrugcoupons website: the main page on the left and a drug-specific page on the right. We begin by scraping the text data of historical versions of the website from www.archive.org. We scrape and then clean the data (e.g., converting text that says "save up to $600 per year" to "$50 off" to reflect savings on a single prescription) both from the main page and the drug-specific pages linked therein. Of the 43 months from June 2007 and December 2010, we have data from 30 months. To fill out coupon data for the missing months, we interpolate data. For example, if the same coupon is known to be present in May and August of some year while the data for June and July is missing, then we code that coupon as also being present in June and July. To take another example, suppose the coupon is not present in May but is available in August, and again the data for June and July is missing. In that case, we use the

Figure 2: Content on www.internetdrugcoupons.com, June 2009

midpoint, coding the coupon as first being available in July. We also make several manual corrections based on internet searches, e.g. to fill out coupon information in cases where the text scraping program does not pull down sufficient information to identify discount types (e.g. free samples, which we do not code as coupons) or amounts.

2.2 Retail Prescription Sales Data (IMS National Prescription Audit)

One row in our raw NPA data is essentially a unique combination of national drug code (NDC) and month. To perform the analyses presented in the text, we collapse this data to the molecule-dosage form-month level. Before doing so, we execute several steps to clean the data.

First, we drop repackager firms who buy drugs from manufacturers and then repack them into different package forms (e.g., blister packs), as it is possible that including repackagers will double-count sales. The list of firms considered to be repackagers is contained in Table I-5 of FTC (2011). Second, we drop injectable drugs because they appear in our data starting in 2009, well after the beginning of our study period. Injectable drugs are identified using the three-letter product code (TLC) variable in the IMS data: the code for injectable preparations typically begin with the letter "F" or "G". Third, we drop products for which over-the-counter use, which is identified by a prescription status variable in the data, accounts for 10 percent or more of total retail prescriptions in the data over all years. Fourth, we convert the three-letter product code variable into a less granular measure of dosage form. For example, the TLC distinguishes between coated and uncoated tablets, and we combine both under the same umbrella. We do retain more significant distinctions that are often associated with new drug applications and/or patents, such as extended release, chewable, and orally disintegrating formulations. Fifth, we reclassify products identified as branded generic in the IMS data using drug approval information from the FDA, when available. As explained in footnote 26, products associated with a New Drug Application (NDA) and a brand name are reclassified as brands. Products associated with an Abbreviated New Drug Application (ANDA) and/or without a brand name are reclassified as generics. Branded generic products without matching FDA approval information maintain their classification as branded generics.

After aggregating the data to the molecule-dosage form level, we convert all monetary quantities to January 2010 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers. We identify the first month during which a drug faces generic competition as the first month in which at least 5 percent of total prescriptions are accounted for by generics. We then perform the four sample restrictions reported in the text:

1. Restrict the sample to drugs facing (new) generic entry between June 2007 and December 2010, the overlapping period of the coupon and IMS datasets.
2. Restrict the sample to drugs with only a single brand and no branded generics.
3. Restrict the sample to drugs for which the timing of generic entry is clear to define (e.g., no patent disputes that result in generics moving in and out of the data).[6]
4. Restrict the sample to non-Schedule II controlled substances[7]

In the coupon data, coupons are linked to brand names. For instance, internetdrugcoupons shows that there is a copay coupon for Differin, not for branded Adapalene (the active ingredient in Differin). The IMS data contains fields listing product brand name in addition to the corresponding molecule(s) and dosage forms. Therefore, we can merge the two datasets using brand names. We carefully scrub the brand names in both datasets to ensure a clean match; for instance, a brand name may originally appear as "Allegra D" in one dataset and "Allegra-D" in another. Since our final sample is restricted to molecule-dosage form combinations with only a single branded drug, we do not need to worry about aggregating coupon information for multiple branded drugs into a single measure for the corresponding molecule-dosage form.

2.3 Insurance Claims Data (NHCHIS)

We begin by restricting the data to claims from residents of New Hampshire and Massachusetts. To identify the same sample of drugs used in the IMS analysis, we merge the list of drugs in the IMS sample into the NHCHIS data using fields in the NHCHIS data that list a drug's name and brand status, again carefully scrubbing the names to ensure a clean match. In some cases, the drug name in the NHCHIS data also identifies the form. For example, "Depakote ER" and its generic "Divalproex Sodium ER" are distinguished from regular "Depakote" and its generic "Divalproex Sodium".

In other cases, however, it is not possible to distinguish between forms in the NHCHIS data. For example, while "Aricept" and "Aricept ODT" are distinct names in the data, all generics appear under the name "Donepezil HCl", not indicating if the tablet is orally

[6]The 15 drugs dropped according to this restriction are (brand names): Buphenyl, Ceftin, Fibricor, Flovent, Focalin, Ionamin, Kytril, Phoslo, Ponstel, Pulmicort, Seromycin, Solodyn, Sular, Vesanoid, and Zerit.

[7]The 3 drugs dropped according to this restriction are (brand names): Adderall XR, Combunox, and Opana.

disintegrating. In these cases, we combine the different dosage forms, e.g. looking at Aricept and its generics as a whole rather than separating out the orally disintegrating formulation. One problem with this approach is that different dosage forms do not necessarily share the same generic entry dates, or coupons. When same molecule drugs with different dosage forms cannot be separated due to a lack of information in the NHCHIS drug name field, and there is a substantial conflict in the generic entry date and/or coupon information, we drop the drug. As a result, we lose Cleocin (Clindamycin; powder dosage form), Evoclin (Clindamycin; aerosol dosage form), Prevacid (Lansoprazole; extended release capsule, orally disintegrating tablet, and powder dosage forms) and Trileptal (Oxcarbazepine; tablet and suspension dosage forms) from the sample. Jointly, these drugs account for around 10 percent of total revenue for in-sample drugs (measuring revenue for each drug over the three months prior to generic entry).

3 Additional empirical results

This section provides tables for results discussed but not reported in the text, primarily the robustness checks from section IV.C. Each set of results is explained in the notes under the table.

Table A1: Drugs with Unclear Coupon Classifications

	Coupon (main text)	No Coupon	Drop
IMS Coupon Effect	-0.081***	-0.073***	-0.080***
	(0.019)	(0.019)	(0.020)
NHCHIS DD Effect	-0.034***	-0.035***	-0.035***
	(0.011)	(0.011)	(0.011)
NHCHIS DDD Effect	-0.063**	-0.066**	-0.066**
	-0.027	(0.028)	(0.028)

Notes: *** $p < .01$, ** $p < .05$, * $p < .10$. The table reports results coding drugs with coupons present in 40 to 60 percent of the months after generic entry as (a) having coupons (as in the main text), (b) not having coupons, and (c) dropping them. "IMS Coupon Effect" refers to column (2) of Table 5, "NHCHIS DD Effect" refers to column (1) of Table 6, and "NHCHIS DDD Effect" refers to Table 7.

Table A2: Leaving Out One Coupon Drug at a Time

	IMS Coupon Effect	IMS Brand Price Effect	NHCHIS DD Effect	NHCHIS DDD Effect
Main text	-0.081***	0.003***	-0.034***	-0.063**
	(0.019)	(0.001)	(0.011)	-0.027
Min	-0.092	0.003	-0.039	-0.109
Max	-0.074	0.004	-0.028	-0.054
Median	-0.081	0.003	-0.034	-0.063
Sig. at 5% level	100%	100%	94%	100%
Sig. at 10% level	100%	100%	100%	100%

Notes: *** $p < .01$, ** $p < .05$, * $p < .10$. The table reports results from dropping one coupon drug at a time and re-estimating the models. The first panel reports the results from the main text, while the bottom panel reports summary statistics for the leave-out specifications. "IMS Coupon Effect" refers to column (2) of Table 5, "IMS Brand Price Effect" refers to column (2) of Table 8, "NHCHIS DD Effect" refers to column (1) of Table 6, and "NHCHIS DDD Effect" refers to Table 7.

Table A3: IMS Prices: Long Differences

Months Before Generic Entry:	3	3	3	6	6	6
Months After Generic Entry:	6	12	18	6	12	18
Coupon	0.035	0.079***	0.052	0.026	0.075**	0.051
	(0.024)	(0.028)	(0.036)	(0.025)	(0.030)	(0.037)
Generic Firms Post	0.012**	0.017**	0.015	0.007	0.016**	0.015
	(0.005)	(0.006)	(0.009)	(0.006)	(0.007)	(0.009)
Refill Percentage	-0.108	0.073	0.039	-0.172	-0.019	-0.063
	(0.101)	(0.146)	(0.190)	(0.106)	(0.154)	(0.192)
Constant	0.091	-0.030	0.100	0.168**	0.046	0.176
	(0.066)	(0.103)	(0.135)	(0.069)	(0.109)	(0.136)
Observations	72	59	47	72	59	47
R-squared	0.090	0.210	0.096	0.065	0.184	0.102
Yearly Price Change						
Without Coupon	9.5%	5.8%	10.7%	10.0%	6.3%	10.4%
With Coupon	14.7%	12.7%	14.1%	13.0%	11.8%	13.2%

Notes: *** $p < .01$, ** $p < .05$, * $p < .10$. The table reports results from estimating the branded price regressions with long differences, varying the points at which prices are measured (3 or 6 months before generic entry and 6, 12, or 18 months after generic entry.

Table A4: NHCHIS DD and DDD Results, 2007-2010

Difference-in-differences	2007-2013	2007-2010
NH	-0.003	-0.007
	(0.007)	(0.009)
NH*Coupon	-0.034***	-0.043***
	(0.011)	(0.014)
Observations	2,106	1,019
R-squared	0.746	0.850

Triple difference	2007-2013	2007-2010
Treated consumers (age<65)		
NH-MA difference, with coupon	-0.037***	-0.050***
	(0.008)	(0.012)
NH-MA difference, without coupon	-0.003	-0.006
	(0.006)	(0.009)
Difference-in-difference	-0.034***	-0.044***
	(0.011)	(0.013)
Control consumers (age≥65)		
NH-MA difference, with coupon	0.034	0.008
	(0.024)	(0.033)
NH-MA difference, without coupon	0.004	-0.002
	(0.015)	(0.028)
Difference-in-difference	0.029	0.010
	(0.031)	(0.047)
DDD	-0.063**	-0.054
	(0.027)	(0.050)
Observations	3,630	1,733
R-squared	0.739	0.852

Notes: *** $p < .01$, ** $p < .05$, * $p < .10$. The table reports difference-in-differences and triple-difference results from restricting the NHCHIS data to 2007-2010 (the same time-frame as the IMS data); the results in the main text use 2007-2013 data.

Table A5: Varying the Functional Form for Generic Firms

	(1)	(2)	(3)	(4)
$\text{geneff}_{t=0}$	0.673***	0.675***	0.676***	0.666***
	(0.027)	(0.028)	(0.029)	(0.024)
Coupon	-0.081***	-0.080***	-0.078***	-0.083***
	(0.019)	(0.019)	(0.017)	(0.018)
Generic Firms	0.013***	0.017	0.061*	
	(0.003)	(0.015)	(0.033)	
Generic Firms^2		-0.000	-0.012*	
		(0.002)	(0.007)	
Generic Firms^3			0.001*	
			(0.000)	
Generic Firms = 2				0.049
				(0.032)
Generic Firms = 3				0.040
				(0.025)
Generic Firms = 4				0.056**
				(0.027)
Generic Firms = 5				0.079***
				(0.026)
Generic Firms $\geq$ 6				0.088***
				(0.026)
Constant	0.068***	0.061	0.015	0.071**
	(0.023)	(0.038)	(0.053)	(0.030)
Observations	1,740	1,740	1,740	1,740

Notes: *** $p < .01$, ** $p < .05$, * $p < .10$. The table reports results from specifications like those in column (2) of Table 5, but varying the functional form of the control for generic competition.

Table A6: NHCHIS DDD Results by Coupon Intensity

	All	High-Intensity	Low-Intensity
Treated consumers (age<65)			
NH-MA difference, with coupon	-0.037***	-0.043***	-0.006
	(0.008)	(0.010)	(0.010)
NH-MA difference, without coupon	-0.003	-0.002	-0.007
	(0.006)	(0.006)	(0.005)
Difference-in-difference	-0.034***	-0.041***	0.001
	(0.011)	(0.011)	(0.012)
Control consumers (age≥65)			
NH-MA difference, with coupon	0.034	0.027	0.068
	(0.024)	(0.022)	(0.083)
NH-MA difference, without coupon	0.004	0.006	-0.000
	(0.015)	(0.015)	(0.014)
Difference-in-difference	0.029	0.021	0.068
	(0.031)	(0.029)	(0.085)
DDD	-0.063**	-0.062**	-0.067
	(0.027)	(0.027)	(0.080)
Observations	3,630	3,136	3,134
R-squared	0.739	0.727	0.731

Notes: *** $p < .01$, ** $p < .05$, * $p < .10$. The table reports triple-difference results separately for high and low intensity coupons.

References

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