Appendix: Figures and Tables

July 21, 2017

Table 1: Descriptive Statistics of Generic Manufacturers and Molecule Markets by Year

Year	Count of Molecules	Count of Mnf	Count of Corp	Annual Revenue (Mil)	Brand Revenue Share	Generic Revenue Share	Oral Revenue Share	Injectable Revenue Share	Other Revenue Share
2004	1716	517	408	295249	83	17	67	23	10
2005	1797	545	437	296272	82	18	66	24	10
2006	1854	555	428	314382	80	20	64	25	10
2007	1895	565	442	317832	80	20	63	26	11
2008	1960	562	437	317622	79	21	62	27	11
2009	2063	572	449	332008	78	22	61	27	12
2010	2106	583	459	345717	76	24	59	28	12
2011	2147	589	463	351710	74	26	58	29	13
2012	2131	609	478	334160	72	28	54	32	14
2013	2195	621	497	343403	71	29	51	34	15
2014	2225	633	509	385600	72	28	52	34	14
2015	2245	652	521	428482	73	27	51	36	13
2016	2158	651	526	446491	74	26	49	38	13

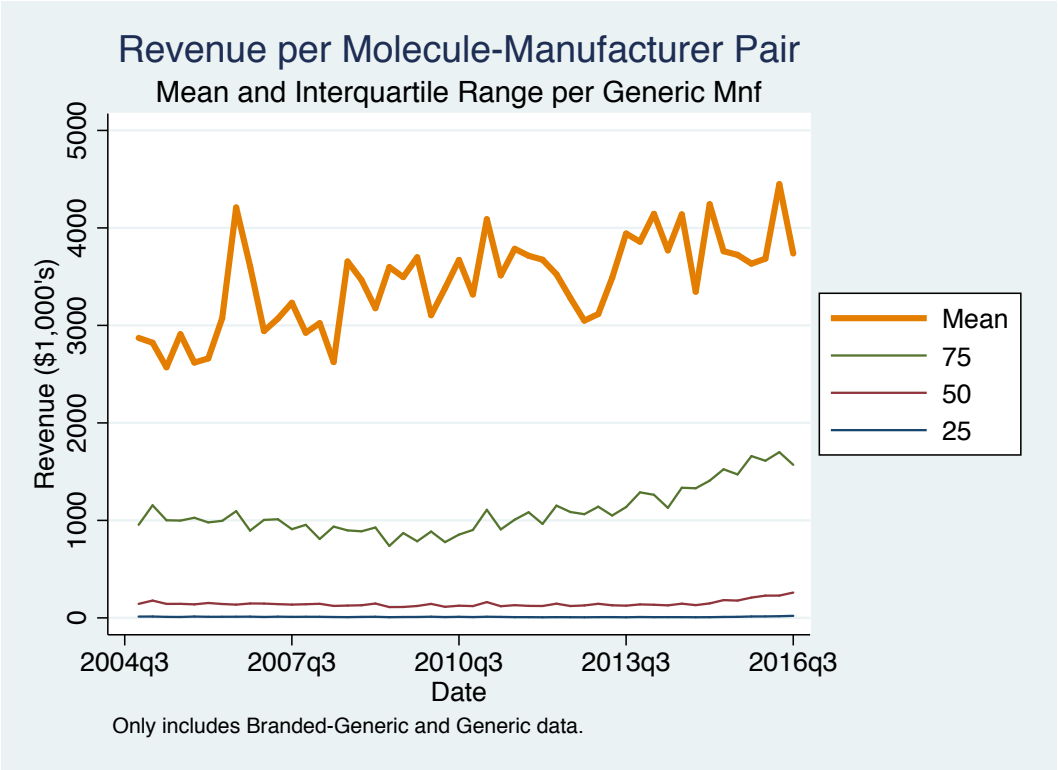
Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. Part-year data for 2004 and 2016 are annualized by linear extrapolation. Molecule markets are defined by molecule-dosage form that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-dosage form quarterly observation, we count the number of unique manufacturers supplying positive volumes and reporting positive dollar sales revenue data in that quarter. This includes manufacturers that begin to supply molecules (entrants) and manufacturers that stop supplying molecules (exits) during the study period.

Table 2: Descriptive Statistics of Sample Molecule Markets by Therapeutic Category

ATC1	Count of Molecules	Count of Mnf	Count of Corp	Avg. Annual Rev (Mil)	Brand Rev Share	Generic Rev Share	Oral Rev Share	Injectable Rev Share	Other Rev Share
A	611	369	318	44472	81	19	63	36	1
B	178	184	150	20463	82	18	33	66	1
C	232	260	205	39456	74	26	94	5	1
D	260	208	180	7442	31	69	13	0	87
G	164	208	171	17911	57	43	70	7	23
H	44	131	107	6478	53	47	45	55	1
J	258	235	179	38863	74	26	62	37	1
K	34	25	28	363	4	96	0	99	1
L	206	152	114	42525	92	8	28	72	0
M	240	330	267	39914	73	27	42	48	9
N	192	263	202	53061	76	24	95	3	2
R	315	283	238	26107	80	20	24	3	73
S	160	130	109	7310	60	40	1	1	98
T	57	43	40	1976	89	11	3	92	5
V	565	121	134	1650	82	18	87	8	5

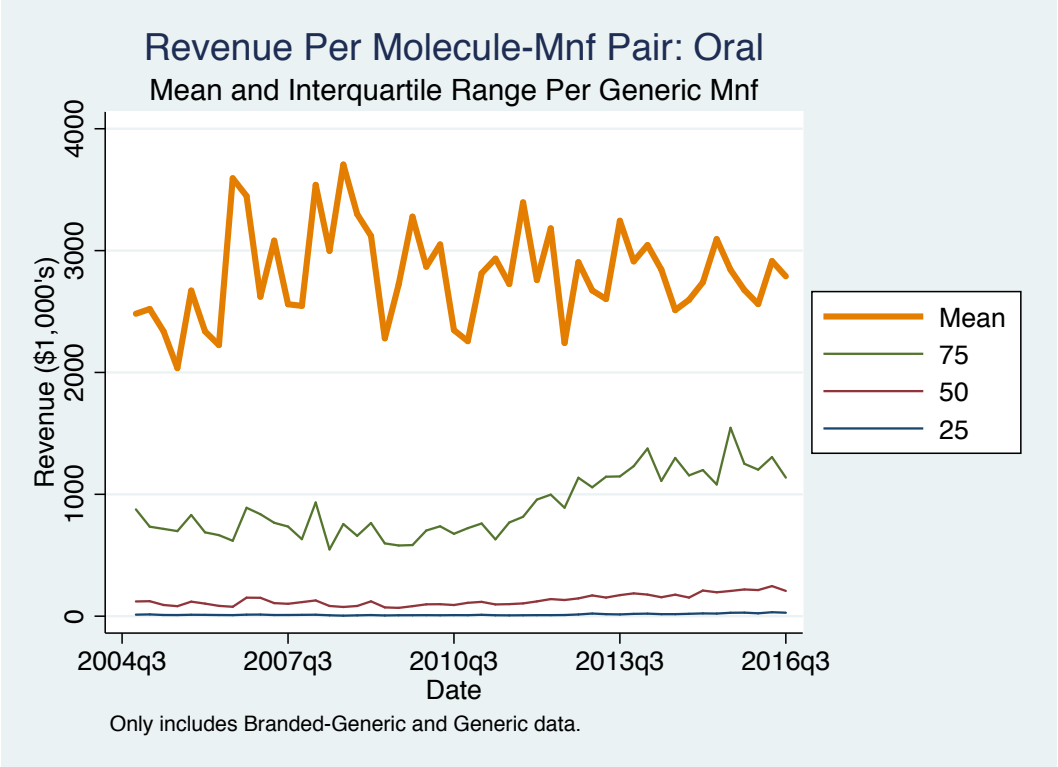
Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. Part-year data for 2004 and 2016 are annualized by linear extrapolation. Molecule markets are defined by molecule-dosage form that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-dosage form quarterly observation, we count the number of unique manufacturers supplying positive volumes and reporting positive dollar sales revenue data in that quarter. This includes manufacturers that begin to supply molecules (entrants) and manufacturers that stop supplying molecules (exits) during the study period. NSP data for each molecule contains a slightly modified version of the World Health Organization's 244 four-digit anatomic therapeutic classification (ATCs). Here we report results by molecule therapeutic class using an aggregated classification system related to the general target of biological activity.

Figure 1: Mean, Median, and Interquartile Range of Quarterly Revenue per Generic Molecule-Dosage Form-Manufacturer Sold in the U.S. by Quarter-Year



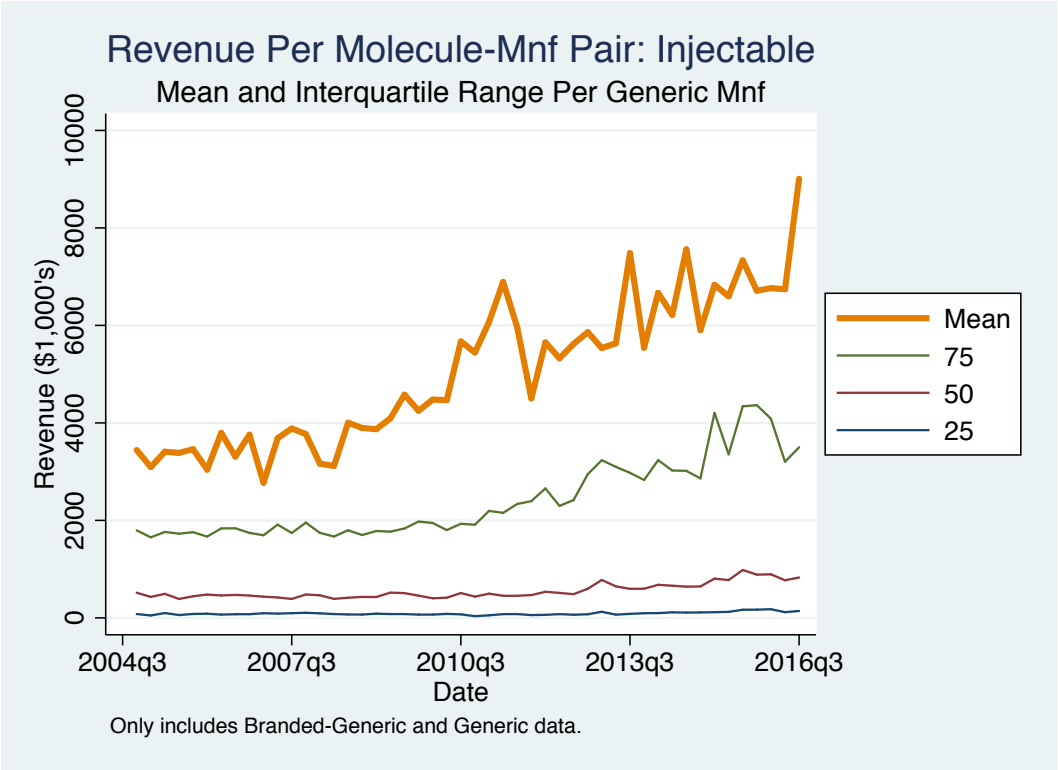
Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. This figure only reports data on generic drugs, including generics and branded generics in QuintilesIMS's classification scheme. Within the QuintilesIMS classification scheme, "Branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder. Molecule markets are defined by molecule-dosage form that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-dosage form quarterly observation, we count the number of unique manufacturers supplying positive volumes and reporting positive dollar sales revenue data in that quarter. This includes manufacturers that begin to supply molecules (entrants) and manufacturers that stop supplying molecules (exits) during the study period.

Figure 2: Mean, Median, and Interquartile Range of Quarterly Revenue per Generic Molecule-Dosage Form-Manufacturer Sold in the U.S by Quarter-Year, Oral Formulated Drugs Only



Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. This figure only reports data on generic drugs, including generics and branded generics in QuintilesIMS's classification scheme. Within the QuintilesIMS classification scheme, "Branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder. Molecule markets are defined by molecule-dosage form that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-dosage form quarterly observation, we count the number of unique manufacturers supplying positive volumes and reporting positive dollar sales revenue data in that quarter. This includes manufacturers that begin to supply molecules (entrants) and manufacturers that stop supplying molecules (exits) during the study period. NSP data for each molecule provides formulation codes to classify drugs into several categories: oral solid tablets or capsules ("oral"); injectable or infusible products ("injectable"); topical preparations; inhaled products, and other formulations (e.g. ocular drugs and patches) ("other").

Figure 3: Mean, Median, and Interquartile Range of Quarterly Revenue per Generic Molecule-Dosage Form-Manufacturer Sold in the U.S by Quarter-Year, Injected or Infused Formulated Drugs Only



Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. This figure only reports data on generic drugs, including generics and branded generics in QuintilesIMS's classification scheme. Within the QuintilesIMS classification scheme, "Branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder. Molecule markets are defined by molecule-dosage form that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-dosage form quarterly observation, we count the number of unique manufacturers supplying positive volumes and reporting positive dollar sales revenue data in that quarter. This includes manufacturers that begin to supply molecules (entrants) and manufacturers that stop supplying molecules (exits) during the study period. NSP data for each molecule provides formulation codes to classify drugs into several categories: oral solid tablets or capsules ("oral"); injectable or infusible products ("injectable"); topical preparations; inhaled products, and other formulations (e.g. ocular drugs and patches) ("other").

Figure 4: Mean, Median, and Interquartile Range of Quarterly Revenue per Generic Molecule-Dosage Form-Manufacturer Sold in the U.S by Quarter-Year, "Other" Formulated Drugs Only

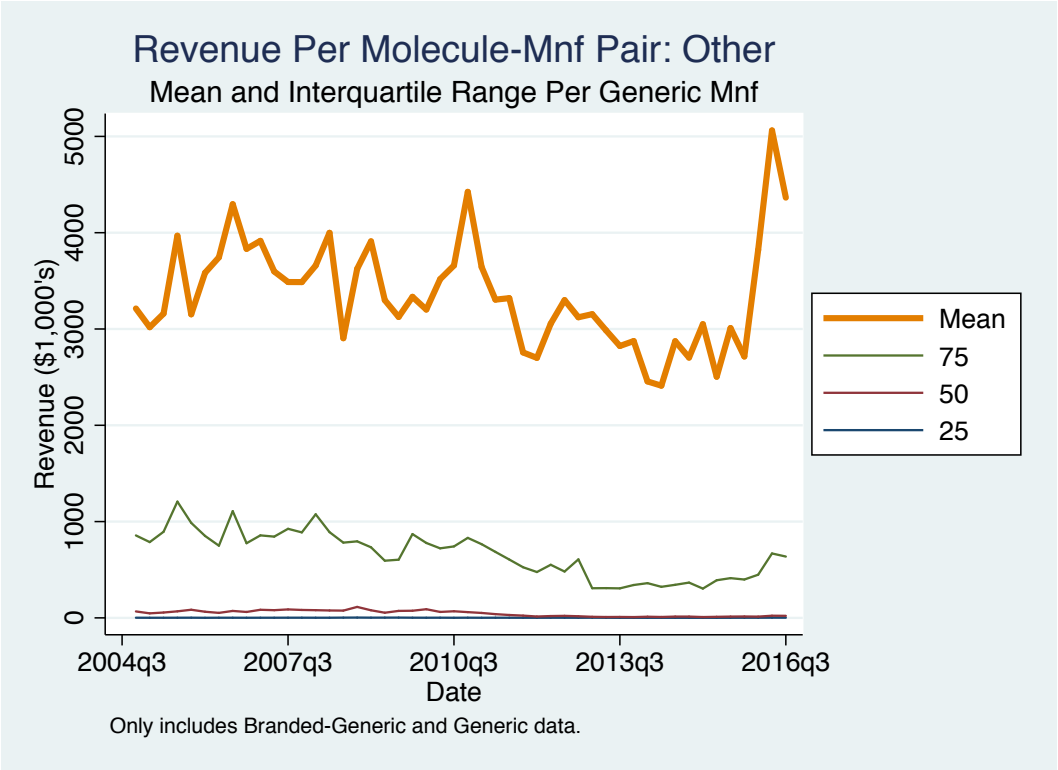


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Figure 5: Generic Manufacturer-Molecule-Dosage Form Entry Patterns between 2004 and 2016 by Quarter-Year

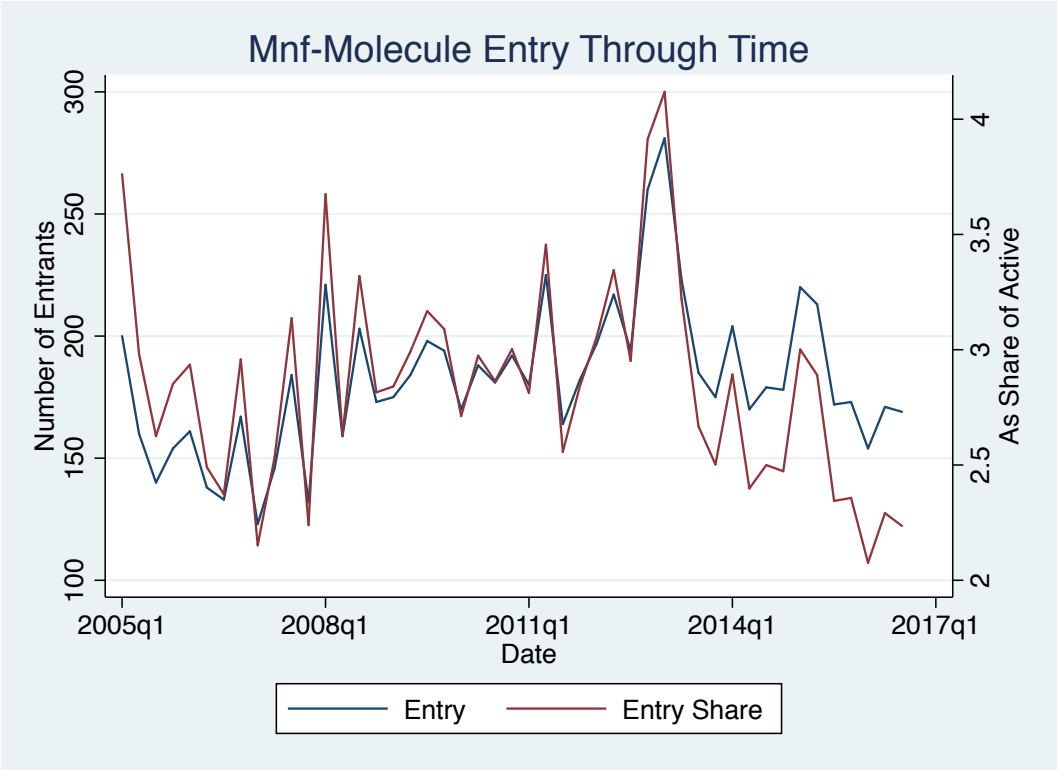

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Figure 6: Generic Manufacturer-Molecule-Dosage Form Exit Patterns between 2004 and 2016 by Quarter-Year

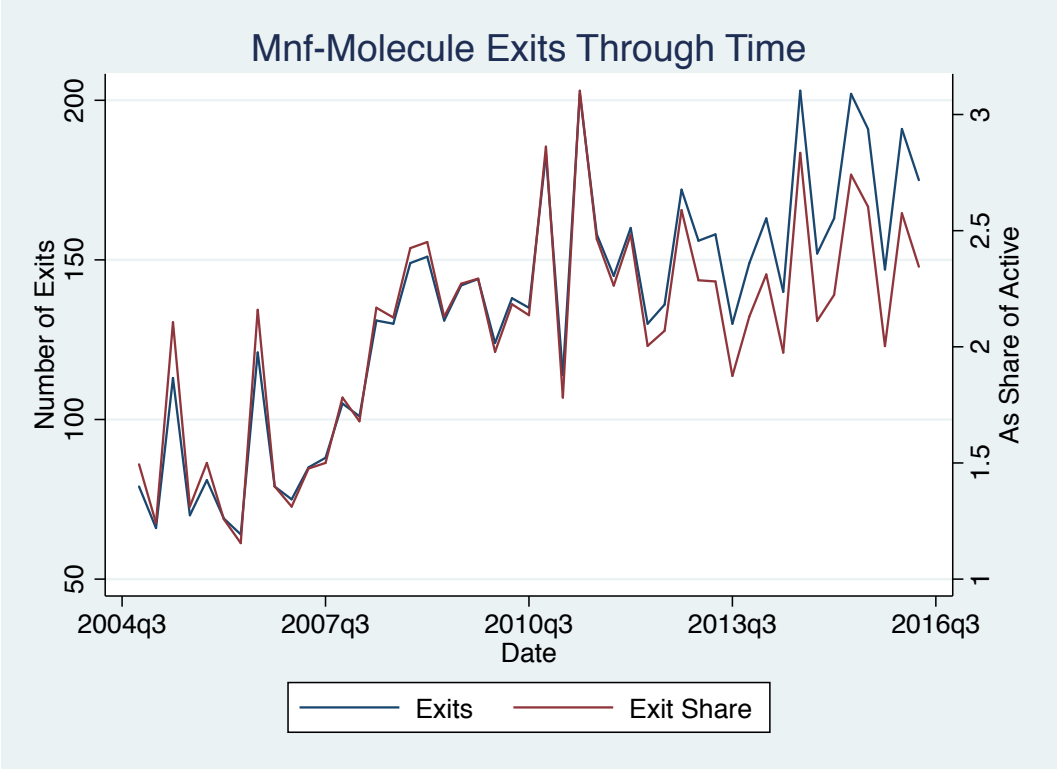

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Figure 7: Generic Entry Share Disaggregated by Molecule Dosage Form-Quarter-Year

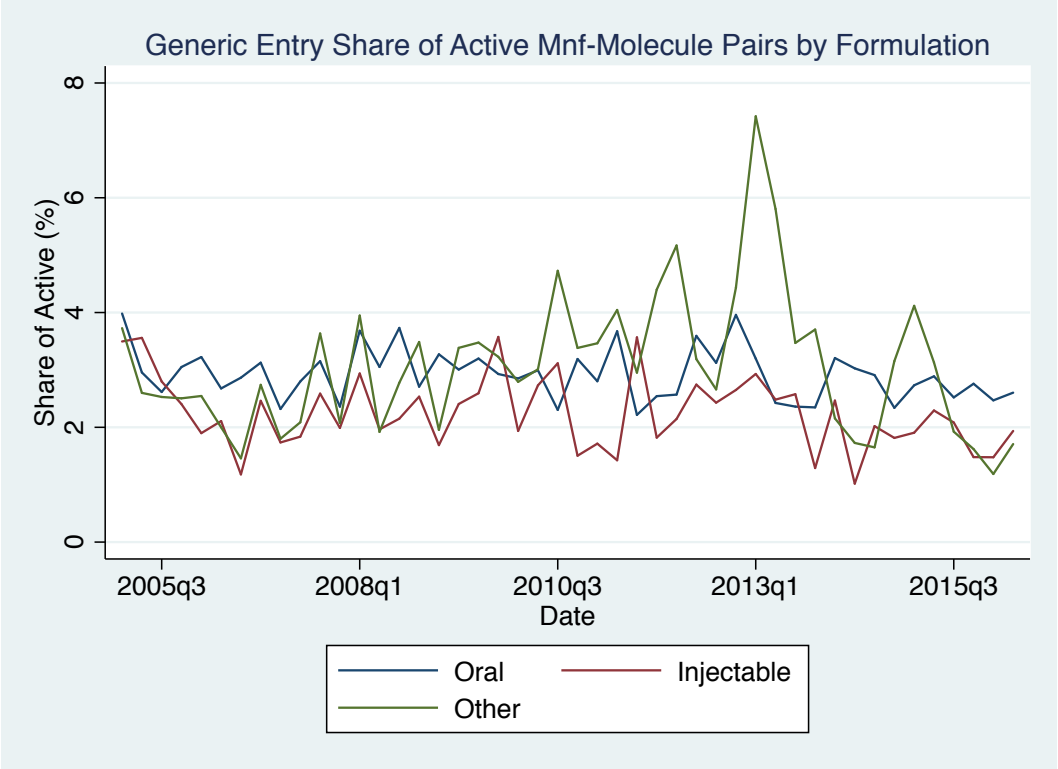

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Figure 8: Generic Exit Share Disaggregated by Molecule Dosage Form-Quarter-Year

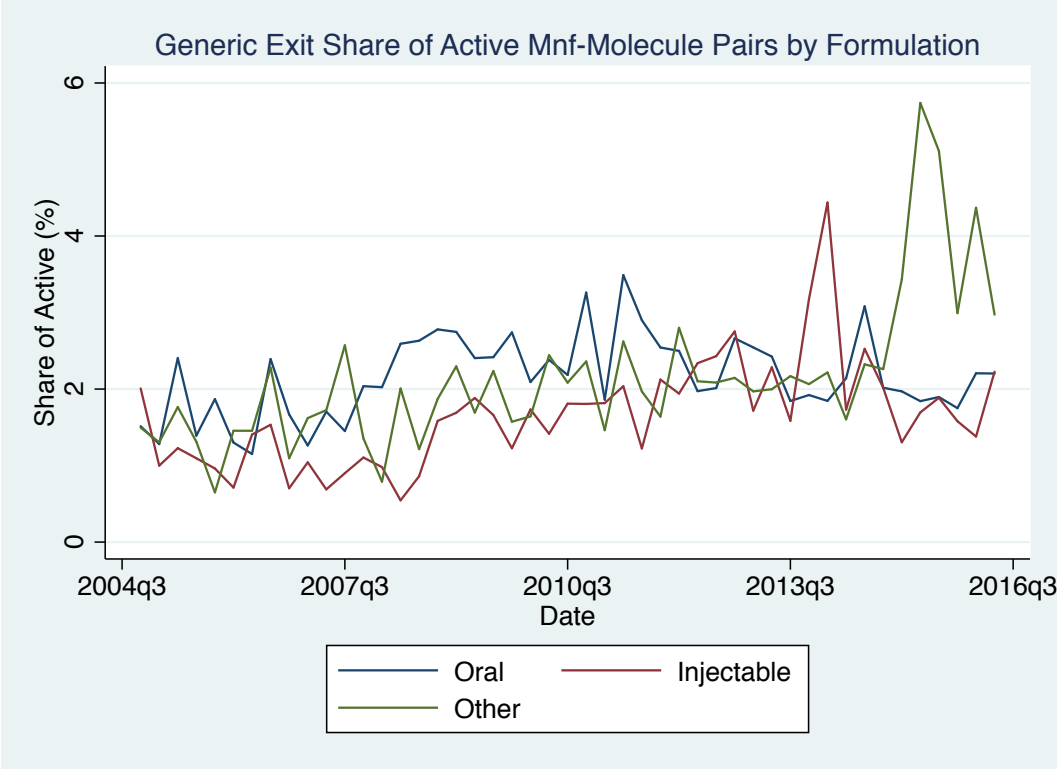

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Figure 9: Manufacturer Entry Share Over Time between Drugs by Patent Status

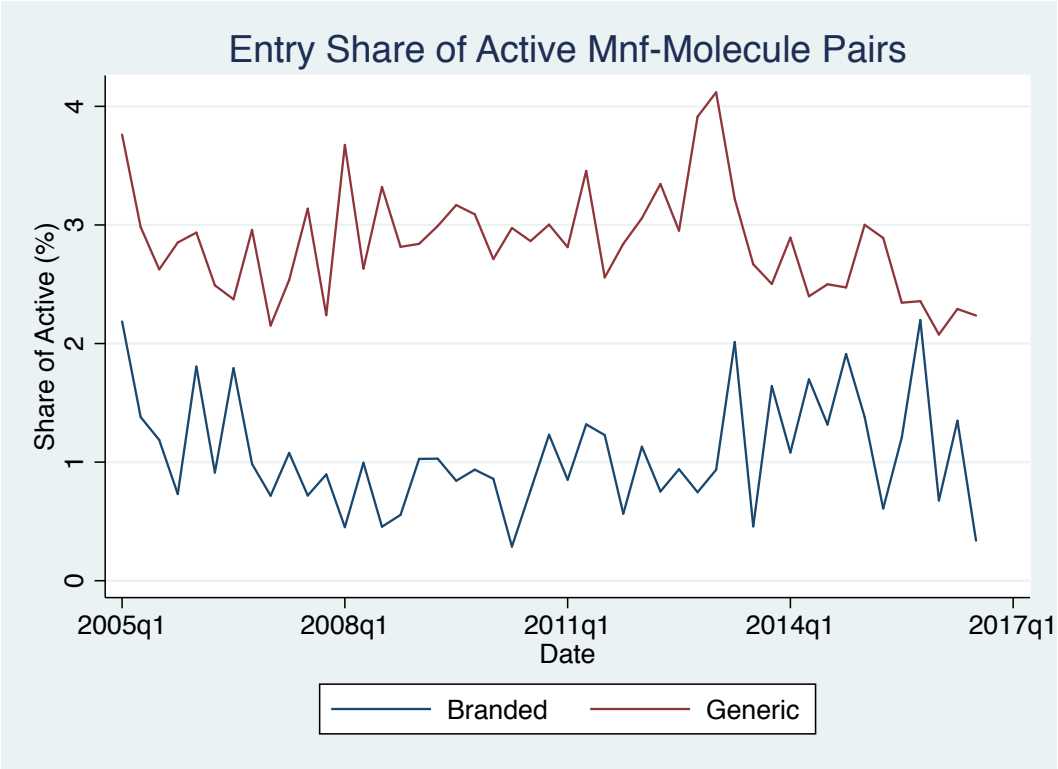

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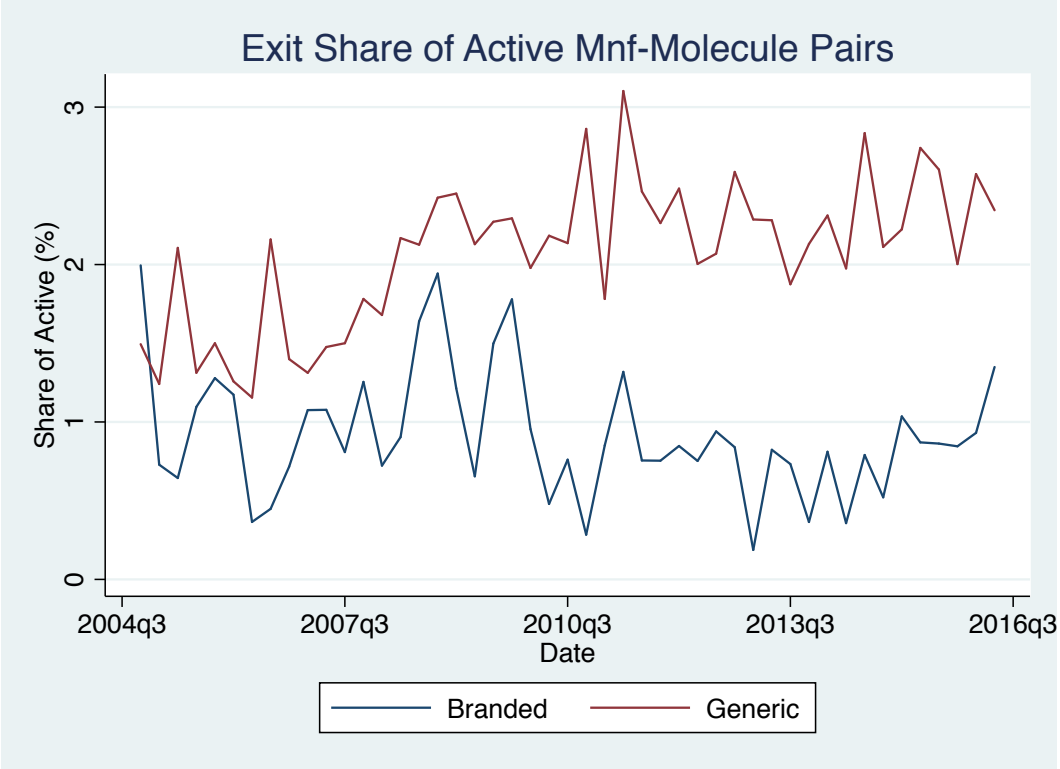
Figure 10: Manufacturer Exit Share Over Time between Drugs by Patent Status



Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. Molecule markets are defined by a molecule that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule quarterly observation, we count the number of unique manufacturers supplying positive unit volumes and reporting positive dollar sales revenue data in that quarter. This figure reports the share of manufacturer-molecule exits into the market across our entire sample relative to the stock of the number of currently active manufacturer-molecule by patent status. NSP contains a data field denoting whether each molecule-dosage form-quarter has "generic", "branded" or "branded generic" patent status. Within the QuintilesIMS classification scheme, "branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder. In this figure, "generics" includes data on both generics and branded generics. Exits are defined as those manufacturers of molecules that are observed immediately following two or more quarters of positive unit volume and dollar sales, to report at least two quarters of zero unit volume and sales data of the molecule. Note that this definition of Exit likely excludes temporary production cessations.

Figure 11: Mean and Interquartile Range of Manufacturer Counts per Generic Molecule Dosage Form by Quarter-Year

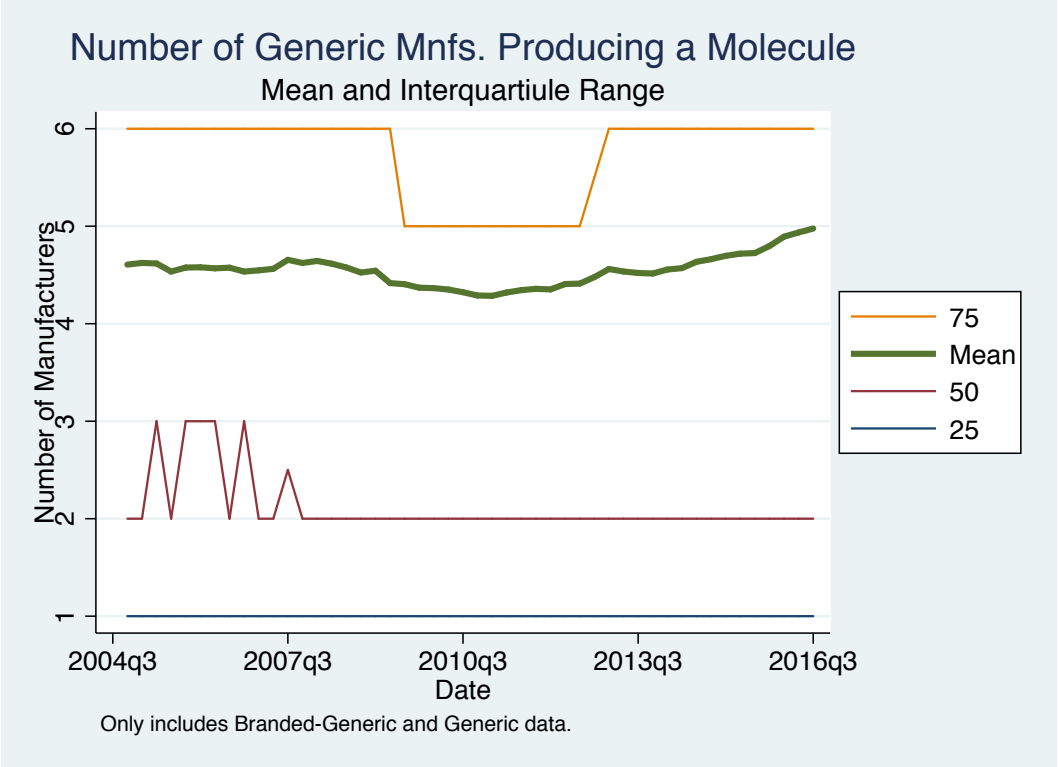


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Figure 12: Manufacturer per Molecule Counts among Oral Generic Drugs by Quarter-Year

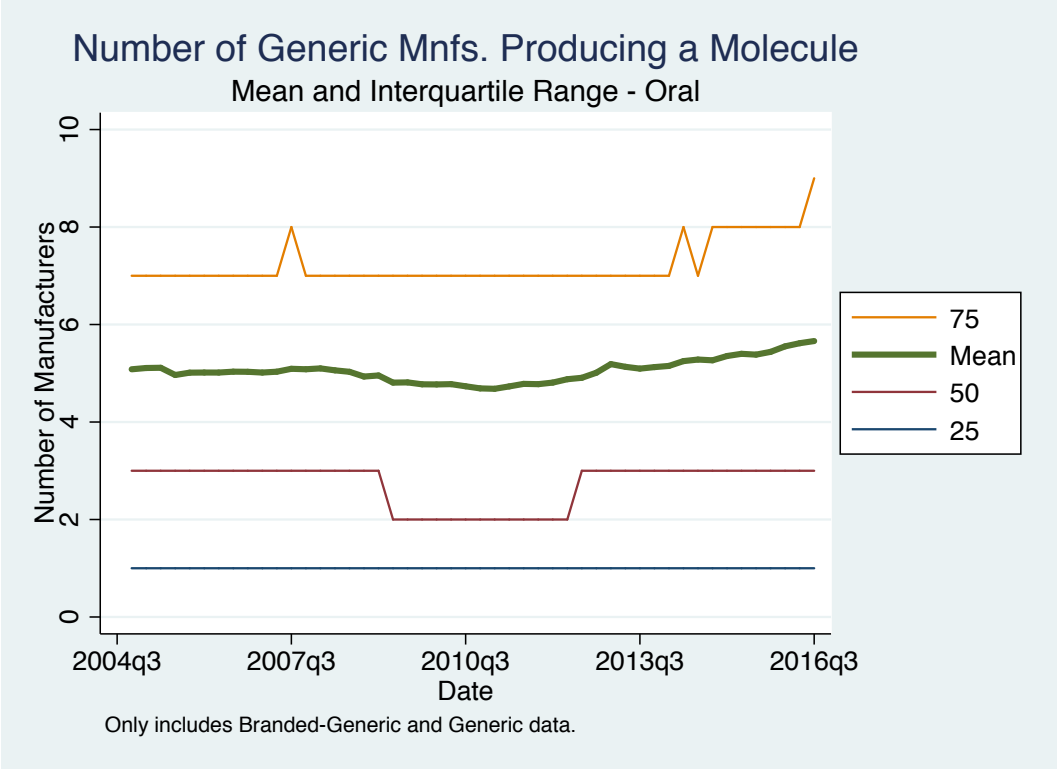

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Figure 13: Manufacturer per Molecule Counts among Infused or Injected Generic Drugs by Quarter-Year

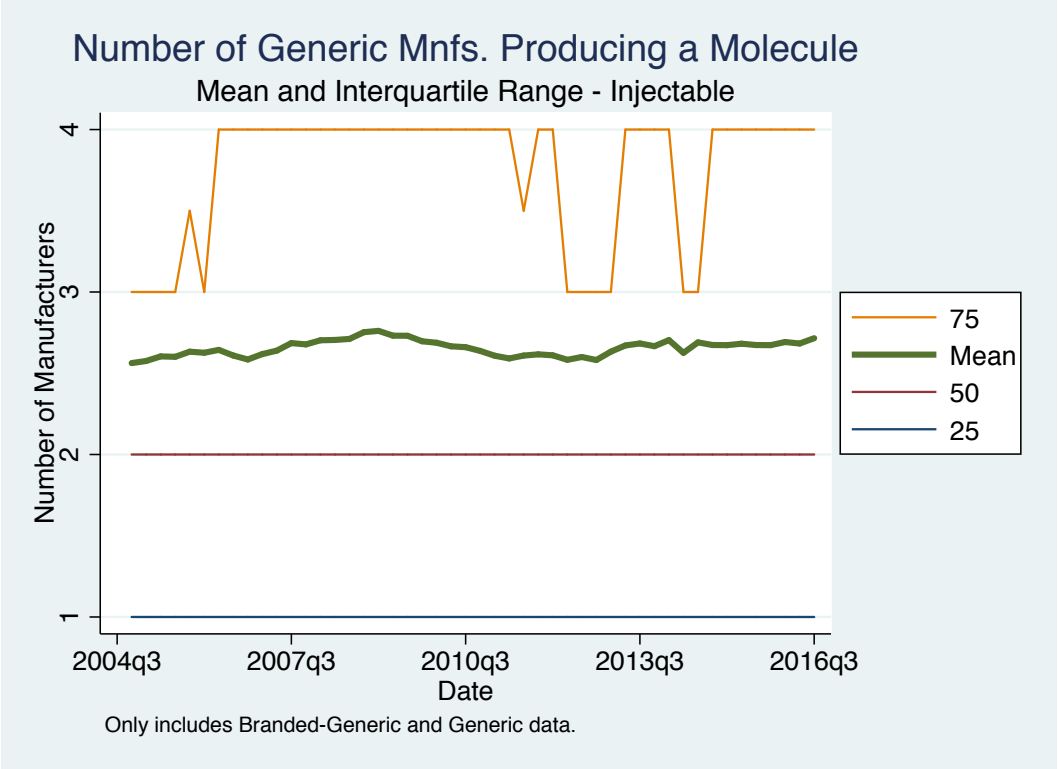

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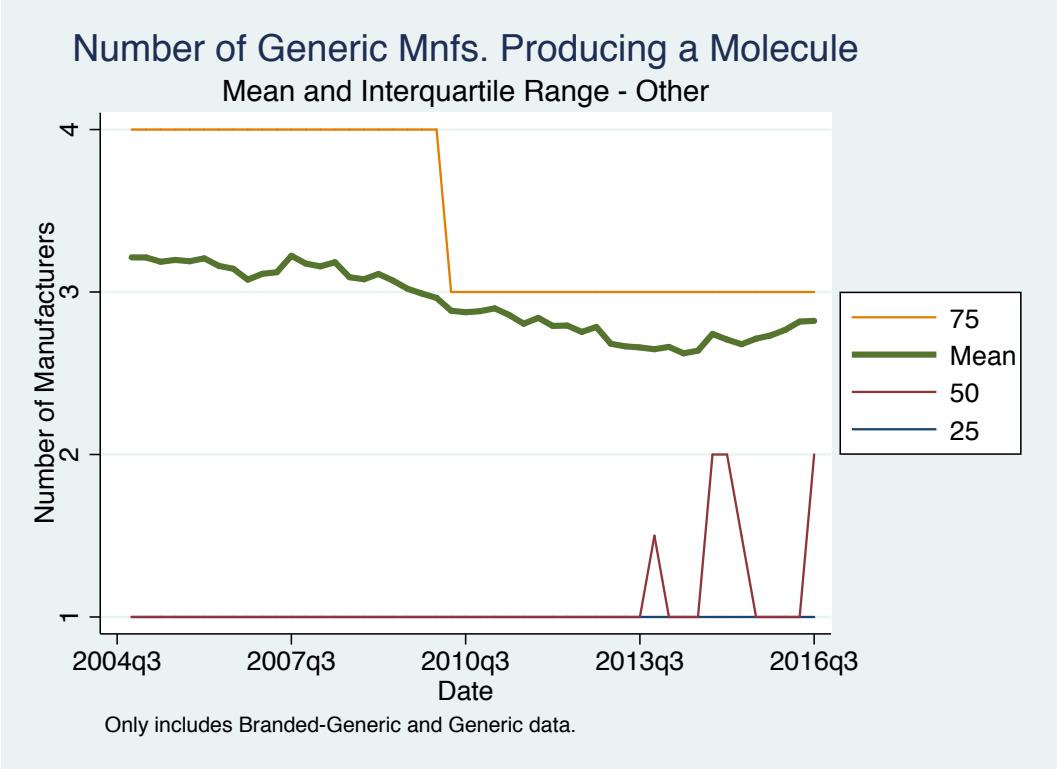
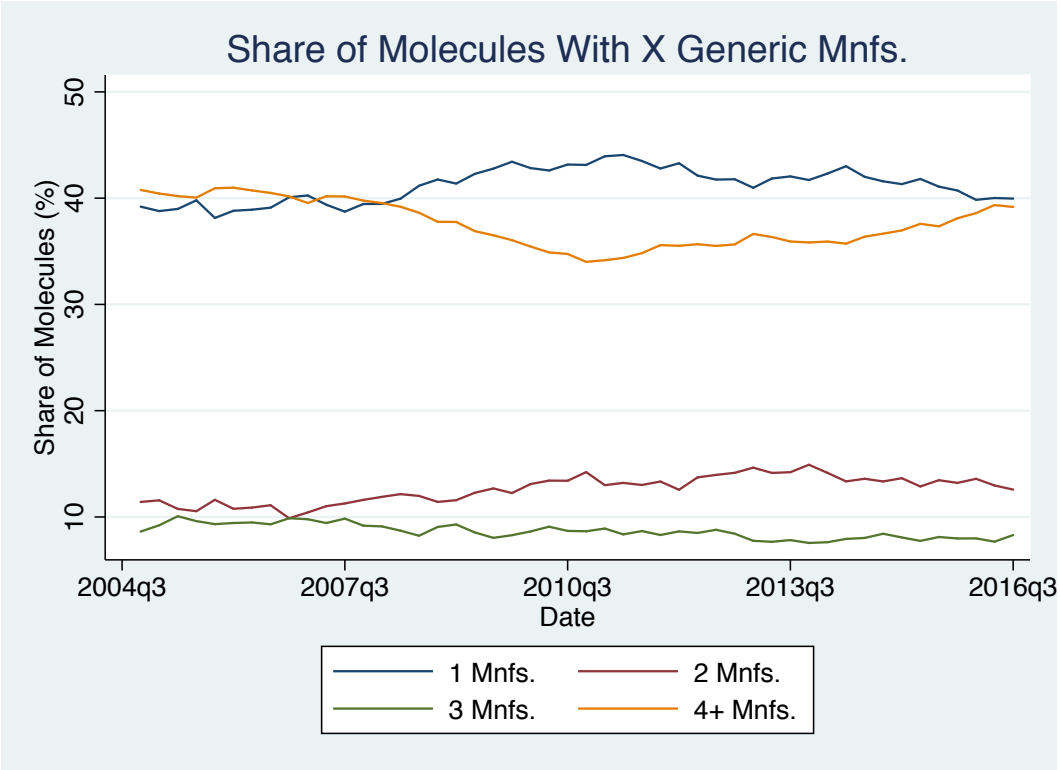
Figure 14: Manufacturer per Molecule Counts among Other Dosage Form Generic Drugs by Quarter-Year



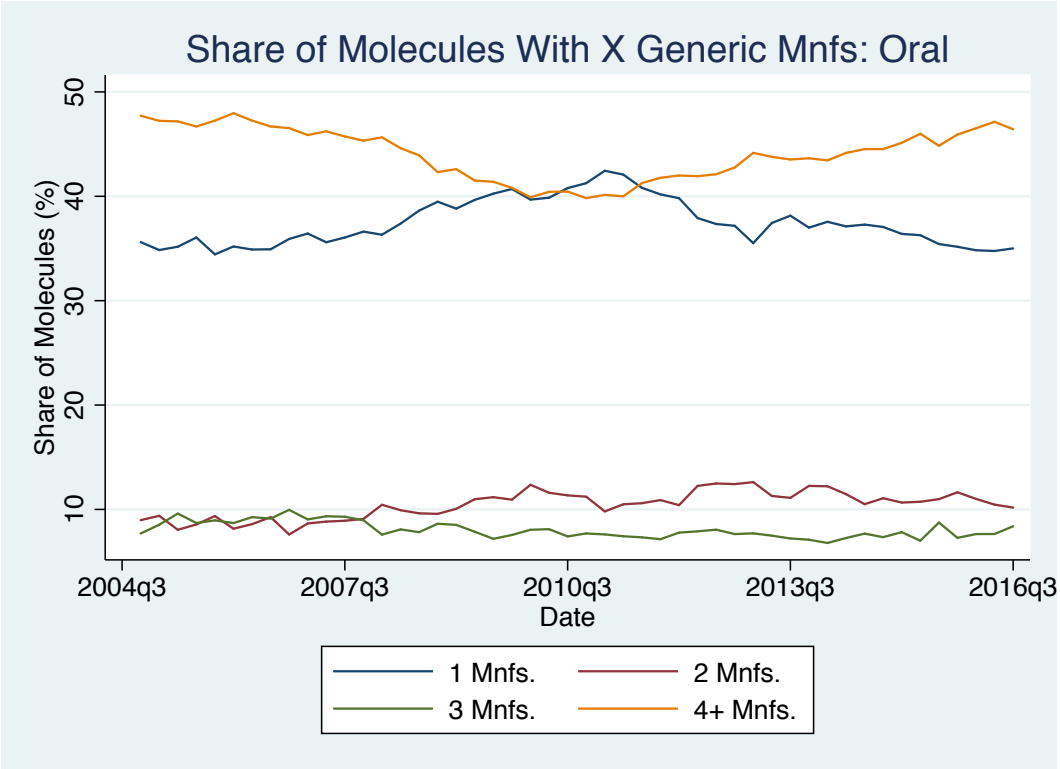
Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. This figure only reports data on generic drugs, including generics and branded generics in QuintilesIMS's classification scheme. Within the QuintilesIMS classification scheme, "branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder. Molecule markets are defined by molecule-dosage form that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-dosage form quarterly observation, we count the number of unique manufacturers supplying positive unit volumes and reporting positive dollar sales revenue data in that quarter among other formulated drugs. NSP data for each molecule provides formulation codes to classify drugs into several categories: oral solid tablets or capsules ("oral"); injectable or infusible products ("injectable"); topical preparations; inhaled products, and other formulations (e.g. ocular drugs and patches) ("other").

Figure 15: Share of Generic Drug Product Markets Supplied by 1, 2 3 and 4 or Greater Manufacturers by Quarter-Year



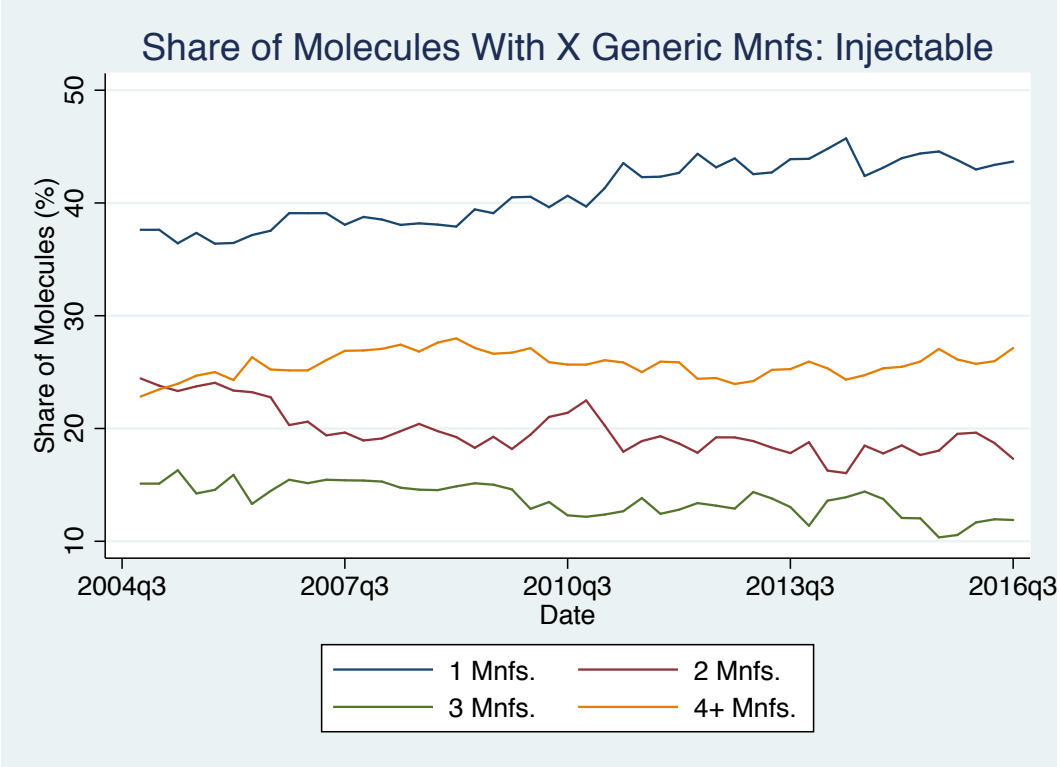
Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. This figure only reports data on generic drugs, including generics and branded generics in QuintilesIMS's classification scheme. Within the QuintilesIMS classification scheme, "branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder. Molecule markets are defined by a molecule that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-quarterly observation, we count the number of unique manufacturers supplying positive unit volumes and reporting positive dollar sales revenue data in that quarter.

Figure 16: Share of Oral Generic Product Markets Supplied by 1, 2 3 and 4 or Greater Manufacturers by Quarter-Year



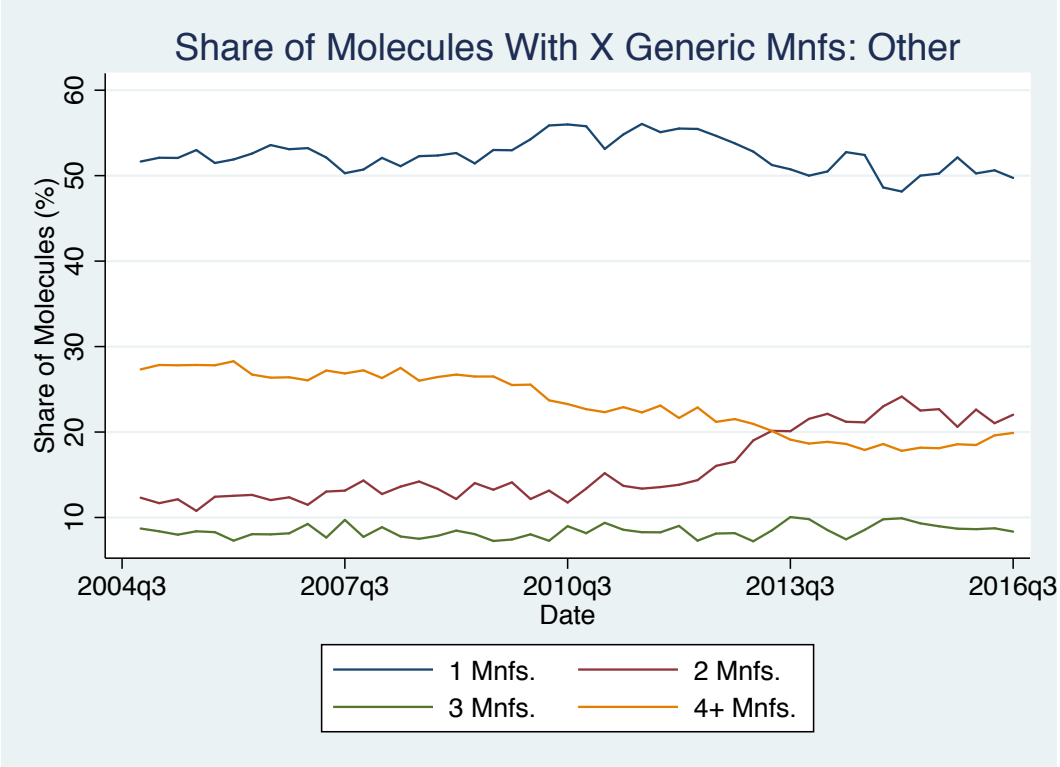
Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. This figure only reports data on generic drugs, including generics and branded generics in QuintilesIMS's classification scheme. Within the QuintilesIMS classification scheme, "branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder. Molecule markets are defined by molecule-dosage form that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-dosage form quarterly observation, we count the number of unique manufacturers supplying positive unit volumes and reporting positive dollar sales revenue data in that quarter among oral drugs. NSP data for each molecule provides formulation codes to classify drugs into several categories: oral solid tablets or capsules ("oral"); injectable or infusible products ("injectable"); topical preparations; inhaled products, and other formulations (e.g. ocular drugs and patches) ("other").

Figure 17: Share of Infused or Injected Generic Product Markets Supplied by 1, 2 3 and 4 or Greater Manufacturers by Quarter-Year



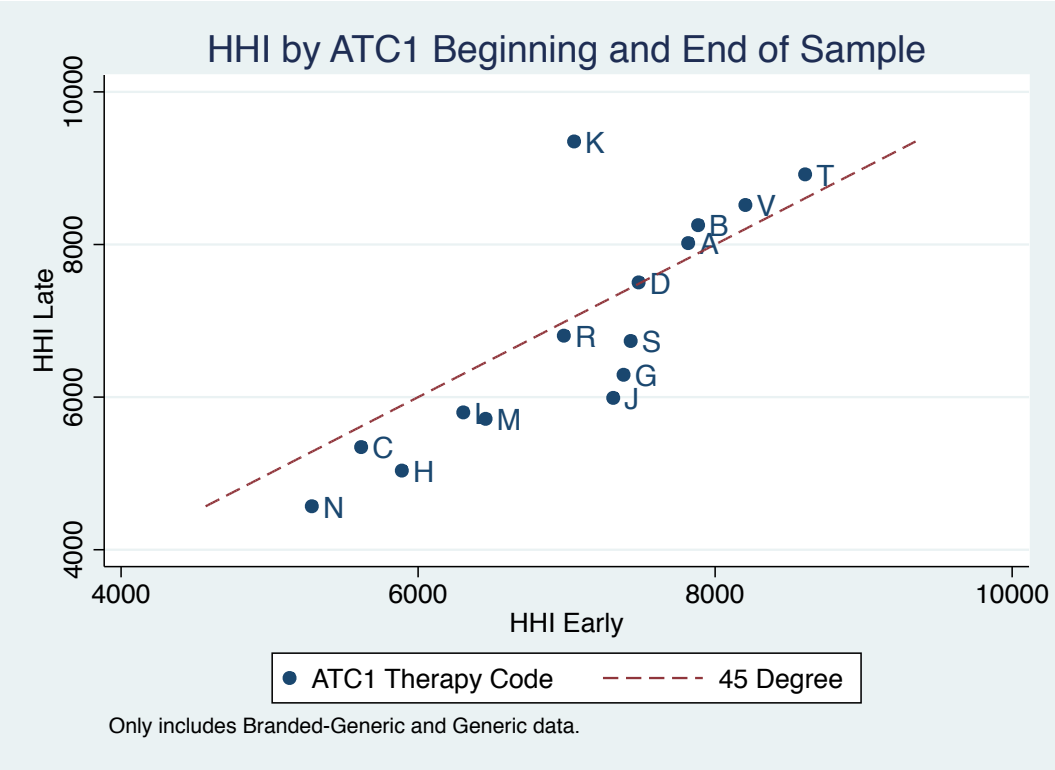
Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. This figure only reports data on generic drugs, including generics and branded generics in QuintilesIMS's classification scheme. Within the QuintilesIMS classification scheme, "branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder. Molecule markets are defined by molecule-dosage form that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-dosage form quarterly observation, we count the number of unique manufacturers supplying positive unit volumes and reporting positive dollar sales revenue data in that quarter among infused or injected drugs. NSP data for each molecule provides formulation codes to classify drugs into several categories: oral solid tablets or capsules ("oral"); injectable or infusible products ("injectable"); topical preparations; inhaled products, and other formulations (e.g. ocular drugs and patches) ("other").

Figure 18: Share of Other Dosage Form Generic Product Markets Supplied by 1, 2 3 and 4 or Greater Manufacturers by Quarter-Year



Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. This figure only reports data on generic drugs, including generics and branded generics in QuintilesIMS's classification scheme. Within the QuintilesIMS classification scheme, "branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder. Molecule markets are defined by molecule-dosage form that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-dosage form quarterly observation, we count the number of unique manufacturers supplying positive unit volumes and reporting positive dollar sales revenue data in that quarter among other formulated drugs. NSP data for each molecule provides formulation codes to classify drugs into several categories: oral solid tablets or capsules ("oral"); injectable or infusible products ("injectable"); topical preparations; inhaled products, and other formulations (e.g. ocular drugs and patches) ("other").

Figure 19: Average Manufacturer Concentration among Only Generic Drugs by Therapeutic Class in Q2 2005 and Q1 2016



Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives' (NSP) database between Q4 2004 and Q3 2016. This figure only reports data on generic drugs, including generics and branded generics in QuintilesIMS's classification scheme. Within the QuintilesIMS classification scheme, "branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder. Molecule markets are defined by a molecule that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-quarterly observation, we count the number of unique manufacturers supplying positive volumes and reporting positive dollar sales revenue data in that quarter. This includes manufacturers that begin to supply molecules (entrants) and manufacturers that stop supplying molecules (exits) during the study period. NSP data for each molecule contains a slightly modified version of the World Health Organization's 244 four-digit anatomic therapeutic classification (ATCs). Here we report results by molecule therapeutic class using an aggregated ATC-based classification system related to the general target of biological activity. Among molecules markets within therapeutic class, we calculated Herfindahl-Hirschman Indices (HHIs) of concentration by quarter. HHIs are a commonly-employed indicator of the extent of competition within a specific market and defined time period. These HHIs were constructed using within molecule manufacturer shares measured in standard units of the molecule sold. Note that shares are defined between 0 and 100 where the max value is 100 and therefore HHI varies between 0 and 10,000. The figure displays the relationship between the average molecule based HHI at the ATC1 level at the beginning and end of our data sample. Points above the 45 degree line are those that have become more concentrated as measured by HHI, and those below the 45 degree line have become less concentrated through time. Please note: a market with a HHI of 10,000 may still have competition from branded products.

Table 3: Regression Results on Generic Exit Share

	(1) Exit Share	(2) Exit Share	(3) Exit Share	(4) Exit Share	(5) Exit Share
1_PreMMA	0.000	0.000			
2_MMA	0.339***	0.354***			
3_ACA	0.816***	0.948***			
4_GDUFA	0.754***	0.896***			
ALL OTHERS		0.000	0.000	0.000	0.000
INJECTABLE		0.190	0.199	0.293	0.333
ORAL		0.491***	0.494***	0.587***	0.884***
A		0.000	0.000	0.000	0.000
B		-0.481***	-0.489***	-0.688**	-0.493***
C		-0.399***	-0.404***	-0.193	-0.402***
D		0.088	0.086	0.038	0.092
G		-0.601***	-0.607***	-0.087	-0.607***
H		-0.325*	-0.327*	-0.106	-0.332*
J		-0.359***	-0.365***	0.043	-0.367***
K		-0.472	-0.484	-0.952	-0.496
L		-0.605***	-0.615***	-0.342	-0.617***
M		-0.042	-0.044	0.338	-0.052
N		-0.601***	-0.613***	-0.225	-0.608***
R		2.335***	2.350***	1.498***	2.322***
S		0.228	0.234	0.804**	0.244
T		-0.129	-0.120	-0.808	-0.116
V		2.662***	2.628***	-1.182**	2.564***
Time Trend			0.025***		
A × Time Trend				0.026***	
B × Time Trend				0.033***	
C × Time Trend				0.017***	
D × Time Trend				0.031***	
G × Time Trend				0.006	
H × Time Trend				0.017	
J × Time Trend				0.010	
K × Time Trend				0.044	
L × Time Trend				0.016	
M × Time Trend				0.010**	
N × Time Trend				0.011**	
R × Time Trend				0.070***	
S × Time Trend				0.006	
T × Time Trend				0.056*	
V × Time Trend				0.149***	
ALL OTHERS × Time Trend					0.036***
INJECTABLE × Time Trend					0.031***
ORAL × Time Trend					0.021***
Constant	1.552***	1.046***	1.052***	0.950***	0.781***
Clusters	2273	2273	2273	2273	2273
R-sqr	0.001	0.013	0.013	0.015	0.014
Obs.	77797	77797	77797	77797	77797

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. This figure only reports data on generic drugs, including generics and branded generics in QuintilesIMS's classification scheme. To save on space, standard errors are not reported in the table, although statistical significance stars are reported at conventional levels. Within the QuintilesIMS classification scheme, "branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder. Molecule markets are defined by molecule-dosage form that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-dosage form quarterly observation, we count the number of unique manufacturers supplying positive volumes and reporting positive dollar sales revenue data in that quarter. This includes manufacturers that begin to supply molecules (entrants) and manufacturers that stop supplying molecules (exits) during the study period. NSP data for each molecule provides formulation codes to classify drugs into several categories: oral solid tablets or capsules ("oral"); injectable or infusible products ("injectable"); topical preparations; inhaled products, and other formulations (e.g. ocular drugs and patches) ("other"). These regressions employ the share of manufacturer-molecule-formulation exits from the market across our entire sample relative to the stock of the number of currently active manufacturer-molecule-formulation pairs. Exits are defined as those manufacturers of molecules that are observed immediately following two or more quarters of positive unit volume and dollar sales, to report at least two quarters of zero unit volume and sales data of the molecule. Note that this definition of Exit likely excludes temporary production cessations. We define four regulatory and insurance coverage regimes: (1) before the Medicare Modernization Act implementation Q4 2004- Q4 2005 "Pre MMA"; (2) after the Medicare Modernization Act implementation Q1 2006 - Q1 2010 "MMA"; (3) after ACA passage and implementation Q2 2010 - Q3 2012 "ACA"; and (4) after GDUFA I implementation Q4 2012 thru Q3 2016 "GDUFA". We estimate ordinary least square regressions of manufacturer exit shares, separately, as a function of regulatory regime. These models including controls for various drug characteristics and time controls. The table displays the results of weighted ordinary least squares regressions modeling various specifications evaluating the relationship between the Exit Share and Characteristics of the Pharmaceutical Industry. Column 1 regresses the molecule-manufacturer Exit share on dummies for regulatory regime. Column 2 adds dummies for formulation type, and ATC1 therapy category. Column 3 adds a single linear time trend. Column 4 estimates therapy code specific time trends. Column 5 estimates formulation specific time trends. Across all specifications standard errors were clustered at the molecule level. The weighting is by the number of current manufacturer's of that particular molecule-formulation-quarter cell.

Table 4: Regression Results of Generic Entry Share

	(1) Entry Share	(2) Entry Share	(3) Entry Share	(4) Entry Share	(5) Entry Share
1_PreMMA	0.000	0.000			
2_MMA	-0.251	-0.268			
3_ACA	-0.016	-0.099			
4_GDUFA	-0.431**	-0.650***			
ALL OTHERS		0.000	0.000	0.000	0.000
INJECTABLE		-0.406*	-0.406*	-0.466**	-0.703*
ORAL		0.370*	0.370*	0.313	0.007
A		0.000	0.000	0.000	0.000
B		0.075	0.071	-0.125	0.072
C		-0.067	-0.071	-0.073	-0.073
D		0.059	0.054	0.251	0.048
G		-0.138	-0.143	-0.985*	-0.144
H		-0.628*	-0.636*	-0.590	-0.632*
J		0.349	0.348	0.882	0.347
K		-0.173	-0.182	-0.561	-0.177
L		0.759*	0.763*	1.010	0.760*
M		-0.224	-0.230	-0.600	-0.226
N		0.328	0.325	0.411	0.321
R		0.046	0.027	0.711	0.046
S		-0.555**	-0.557**	-0.417	-0.568**
T		-1.125***	-1.126***	-0.902	-1.126***
V		4.442***	4.422***	7.323***	4.483***
Time Trend			-0.014***		
A × Time Trend				-0.009	
B × Time Trend				-0.002	
C × Time Trend				-0.009	
D × Time Trend				-0.018*	
G × Time Trend				0.022*	
H × Time Trend				-0.011	
J × Time Trend				-0.029*	
K × Time Trend				0.005	
L × Time Trend				-0.018	
M × Time Trend				0.005	
N × Time Trend				-0.012	
R × Time Trend				-0.041***	
S × Time Trend				-0.016*	
T × Time Trend				-0.018	
V × Time Trend				-0.101***	
ALL OTHERS × Time Trend					-0.025***
INJECTABLE × Time Trend					-0.014*
ORAL × Time Trend					-0.011**
Constant	3.076***	2.807***	2.843***	2.759***	3.122***
Clusters	2276	2276	2276	2276	2276
R-sqr	0.000	0.008	0.007	0.008	0.007
Obs.	78295	78295	78295	78295	78295

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. This figure only reports data on generic drugs, including generics and branded generics in QuintilesIMS's classification scheme. To save on space, standard errors are not reported in the table, although statistical significance stars are reported at conventional levels. Within the QuintilesIMS classification scheme, "branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder. Molecule markets are defined by molecule-dosage form that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-dosage form quarterly observation, we count the number of unique manufacturers supplying positive volumes and reporting positive dollar sales revenue data in that quarter. This includes manufacturers that begin to supply molecules (entrants) and manufacturers that stop supplying molecules (exits) during the study period. NSP data for each molecule provides formulation codes to classify drugs into several categories: oral solid tablets or capsules ("oral"); injectable or infusible products ("injectable"); topical preparations; inhaled products, and other formulations (e.g. ocular drugs and patches) ("other"). These regressions include the share of new manufacturer-molecule entrants into the market across our entire sample relative to the stock of the number of currently active manufacturer-molecule pairs. Entrants are defined as those manufacturers of molecules that are observed immediately following two quarters of zero unit volume and dollar sales, to report at least two quarters of positive unit volume and sales data of the molecule. We define four regulatory and insurance coverage regimes: (1) before the Medicare Modernization Act implementation Q4 2004 - Q4 2005 "Pre MMA"; (2) after the Medicare Modernization Act implementation Q1 2006 - Q1 2010 "MMA"; (3) after ACA passage and implementation Q2 2010 - Q3 2012 "ACA"; and (4) after GDUFA I implementation Q4 2012 thru Q3 2016 "GDUFA." We estimate weighted ordinary least square regressions of manufacturer entrant shares, separately, as a function of regulatory regime. These models including controls for various drug characteristics and time controls. The table displays the results of weighted ordinary least squares regressions modeling various specifications evaluating the relationship between the Entrant Share and Characteristics of the Pharmaceutical Industry. Column 1 regresses the molecule-manufacturer Exit share on dummies for regulatory regime. Column 2 adds dummies for formulation type, and ATC1 therapy category. Column 3 adds a single linear time trend. Column 4 estimates therapy code specific time trends. Column 5 estimates formulation specific time trends. Across all specifications standard errors were clustered at the molecule level. The weighting is by the number of current manufacturer's of that particular molecule-formulation-quarter cell.

Table 5: Regression Results of Log Inflation-Adjusted Generic Price on Supplier Counts

	(1) Log Price	(2) Log Price	(3) Log Price	(4) Log Price	(5) Log Price	(6) Log Price	(7) Log Price	(8) Log Price	(9) Log Price	(10) Log Price	(11) Log Price	(12) Log Price	(13) Log Price
Log Corp		-0.736***	-0.737***	-0.797***	-0.803***	-0.731***	-0.378***						
Log Mnf								-0.720***	-0.721***	-0.772***	-0.777***	-0.706***	-0.374***
1_PreMMA	0.000	0.000						0.000					
2_MMA	0.101***	0.075***						0.081***					
3_ACA	0.401***	0.331***						0.337***					
4_GDUFA	0.751***	0.719***						0.724***					
A				0.000						0.000			
B				0.981***						0.978***			
C				0.663***						0.664***			
D				1.000***						0.999***			
G				1.888***						1.883***			
H				1.346***						1.336***			
J				2.701***						2.692***			
K				2.559***						2.555***			
L				4.138***						4.118***			
M				1.237***						1.230***			
N				0.584***						0.596***			
R				0.266**						0.255*			
S				-0.697***						-0.678***			
T				3.589***						3.590***			
V				1.045***						1.046***			
Constant	-0.082	0.668***	1.028***	0.127	0.375	-0.288***	0.526***	0.647***	1.012***	0.105	0.696***	0.658***	0.518***
Date FE	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
ATC1 FE	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
ATC2 FE	No	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
ATC3 FE	No	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
Molecule FE	No	No	No	No	No	No	Yes	No	No	No	No	No	Yes
Clusters	2281	2281	2281	2281	2281	2281	2281	2281	2281	2281	2281	2281	2281
R-sqr	0.02	0.11	0.11	0.32	0.45	0.54	0.94	0.11	0.12	0.32	0.45	0.54	0.94
Obs.	67416	67416	67416	67416	67416	67416	67416	67416	67416	67416	67416	67416	67416

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. This figure only reports data on generic drugs, including generics and branded generics in QuintilesIMS's classification scheme. To save on space, standard errors are not reported in the table, although statistical significance stars are reported at conventional levels. Within the QuintilesIMS classification scheme, "branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder. Molecule markets are defined by a molecule that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-dosage form quarterly observation, we count the number of unique manufacturers supplying positive volumes and reporting positive dollar sales revenue data in that quarter. This includes manufacturers that begin to supply molecules (entrants) and manufacturers that stop supplying molecules (exits) during the study period. We converted dollar sales into Q1 2016 U.S. dollars using the Gross

Domestic Implicit Price deflator. To calculate net inflation-adjusted prices per unit of molecule sold, we divided molecule inflation-adjusted sales revenues by standard units sold in each quarter. The resulting price estimates reflect the actual invoice prices pharmacies, hospitals and clinics pay for the drugs, whether purchased directly from a manufacturer or indirectly via a wholesaler or chain warehouse. Invoice line item discounts are included, but prompt-payment, bottom-line invoice and 340B discounts are not included. We define four regulatory and insurance coverage regimes: (1) before the Medicare Modernization Act implementation Q4 2004- Q4 2005 "Pre MMA"; (2) after the Medicare Modernization Act implementation Q1 2006 - Q1 2010 "MMA"; (3) after ACA passage and implementation Q2 2010 - Q3 2012 "ACA"; and (4) after GDUFA I implementation Q4 2012 thru Q3 2016 "GDUFA." NSP data for each molecule provides formulation codes to classify drugs into several categories: oral solid tablets or capsules ("oral"); injectable or infusible products ("injectable"); topical preparations; inhaled products, and other formulations (e.g. ocular drugs and patches) ("other"). Here we report estimates of ordinary least squares regressions modeling molecule inflation adjusted log price levels as a function of regulatory regime, drug characteristics, log counts of manufacturers or corporations supplying the molecule. This table reports the results of various ordinary least square regression specifications evaluating the relationship between Log Price and logged counts of molecule manufacturers or the alternative measure of manufacturers corporations. Column 1 includes a simple regression of Log Price on Regulatory Regime. Column 2 begins the main analysis by adding in Log Corporations. Column 3 adds date FE. Column 4 adds ATC1 FE. Column 5 adds ATC2 FE. Column 6 adds ATC3 FE. Column 7 adds molecule FE. Columns 8 - 13 repeat columns 2 - 7 except using Log Mnf instead of Log Corp. Across all specifications standard errors were clustered at the molecule level.

Table 6: Regression Results of Log Inflation-Adjusted Generic Price on Log Concentration

	(1) Log Price	(2) Log Price	(3) Log Price	(4) Log Price	(5) Log Price	(6) Log Price	(7) Log Price	(8) Log Price	(9) Log Price	(10) Log Price	(11) Log Price	(12) Log Price	(13) Log Price
Log HHI		0.892***	0.894***	0.916***	0.963***	0.927***	0.843***						
ALL OTHERS × Log HHI								1.589***	1.589***	1.278***	1.255***	1.250***	1.176***
INJECTABLE × Log HHI								0.895***	0.896***	1.003***	0.993***	0.944***	0.961***
ORAL × Log HHI								0.676***	0.678***	0.774***	0.847***	0.807***	0.657***
1_PreMMA	0.000	0.000						0.000					
2_MMA	0.107***	0.122***						0.127***					
3_ACA	0.445***	0.424***						0.424***					
4_GDUFA	0.836***	0.849***						0.839***					
ALL OTHERS		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
INJECTABLE		2.349***	2.351***	1.648***	1.487***	1.070***	1.022***	2.159***	2.162***	1.593***	1.423***	0.994***	0.954***
ORAL		-0.910***	-0.908***	-1.242***	-1.184***	-1.601***	-1.570***	-1.216***	-1.213***	-1.413***	-1.330***	-1.756***	-1.829***
A				0.000						0.000			
B				0.469***						0.464***			
C				0.147						0.105			
D				0.116						0.128			
G				1.543***						1.518***			
H				0.541*						0.503*			
J				1.254***						1.216***			
K				0.308						0.261			
L				2.290***						2.262***			
M				0.503***						0.468***			
N				0.362**						0.300**			
R				0.250*						0.246*			
S				-1.595***						-1.573***			
T				1.824***						1.791***			
V				0.564***						0.504**			
Constant	0.055	0.384***	0.831***	0.752***	0.775***	1.099***	1.240***	0.576***	1.022***	0.870***	0.854***	1.185***	1.367***
Date FE	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
ATC1 FE	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
ATC2 FE	No	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
ATC3 FE	No	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
Molecule FE	No	No	No	No	No	No	Yes	No	No	No	No	No	Yes
Clusters	2281	2281	2281	2281	2281	2281	2281	2281	2281	2281	2281	2281	2281
R-sqr	0.02	0.37	0.37	0.45	0.51	0.57	0.86	0.38	0.38	0.46	0.51	0.57	0.86
Obs.	79641	79641	79641	79641	79641	79641	79641	79641	79641	79641	79641	79641	79641

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Legend: Authors calculations based on QuintilesIMS's National Sales Perspectives (NSP) database between Q4 2004 and Q3 2016. This figure only reports data on generic drugs, including generics and branded generics in QuintilesIMS's classification scheme. To save on space, standard errors are not reported in the table, although statistical significance stars are reported at conventional levels. Within the QuintilesIMS classification scheme, "branded generics" are drugs belonging to the following categories: (i) Novel dosage forms of off-patent products, often in combination with another molecule; (ii) On patent with a trade name, but a molecule copy of an originator product FDA approved under an existing NDA; (iii) Off patent drugs with a trade name and (iv) Off patent without a trade name and commonly manufactured by a single source or co-licensed from the NDA holder.

Molecule markets are defined by molecule-dosage form that may be manufactured or marketed by multiple suppliers. Manufacturers of molecule markets are defined as: For each molecule-dosage form quarterly observation, we count the number of unique manufacturers supplying positive volumes and reporting positive dollar sales revenue data in that quarter. This includes manufacturers that begin to supply molecules (entrants) and manufacturers that stop supplying molecules (exits) during the study period. We converted dollar sales into Q1 2016 U.S. dollars using the Gross Domestic Implicit Price deflator. To calculate net inflation-adjusted prices per unit of molecule sold, we divided molecule inflation-adjusted sales revenues by standard units sold in each quarter. The resulting price estimates reflect the actual invoice prices pharmacies, hospitals and clinics pay for the drugs, whether purchased directly from a manufacturer or indirectly via a wholesaler or chain warehouse. Invoice line item discounts are included, but prompt-payment, bottom-line invoice and 340B discounts are not included. NSP data for each molecule provides formulation codes to classify drugs into several categories: oral solid tablets or capsules ("oral"); injectable or infusible products ("injectable"); topical preparations; inhaled products, and other formulations (e.g. ocular drugs and patches) ("other"). We define four regulatory and insurance coverage regimes: (1) before the Medicare Modernization Act implementation Q4 2004- Q4 2005 "Pre MMA"; (2) after the Medicare Modernization Act implementation Q1 2006 - Q1 2010 "MMA"; (3) after ACA passage and implementation Q2 2010 - Q3 2012 "ACA"; and (4) after GDUFA I implementation Q4 2012 thru Q3 2016 "GDUFA". Here we report estimates of ordinary least squares regressions modeling molecule inflation adjusted log price levels as a function of regulatory regime, drug characteristics and alternative measures of molecule supplier concentration (HHI). This table reports the results of various ordinary least squares regression specifications of Log Price on Log HHI, at the molecule-quarter level. The first column reports a simple regression of Log Price on regulatory regime fixed effects. The second column begins the primary analysis by adding in Log HHI and formulation type fixed effects. Column 3 adds date fixed effects. Column 4 adds ATC1 fixed effects Column 5 adds ATC2 fixed effects. Column 6 adds ATC3 fixed effects. Column 7 adds molecule level fixed effects. Columns 8-13 repeat specifications 2-7 except estimating separate elasticities between Log Price and Log HHI for each of the formulation types: oral, injectable and other. Across all specifications standard errors were clustered at the molecule level.