

SUPPLEMENTAL APPENDIX

Appendix A Additional evidence for Section 4 (reduced form results)

TABLE A1: LINEAR PARALLEL TREND TEST ON RETAIL PRICES

Sample	(1) All data	(2) CB+EC	(3) IB	(4) All data	(5) CB+EC	(6) IB
Trend	0.0014*** (0.000)	0.0014*** (0.000)	0.0018*** (0.000)	-0.0001*** (0.000)	-0.0002*** (0.000)	0.0005*** (0.000)
Trend × Treated	0.0009*** (0.000)	0.0008*** (0.000)	0.0008*** (0.000)	0.0009*** (0.000)	0.0010*** (0.000)	0.0002*** (0.000)
Time FE	YES	YES	YES	YES	YES	YES
Market FE	YES	YES	YES	YES	YES	YES
ISBN FE				YES	YES	YES
Observations	1,785,635	1,405,508	380,127	1,785,635	1,405,508	380,127

Notes: This table presents estimated coefficients from a test of parallel trends for retail prices between treatment and control group in the pre-treatment period (January 2009-February 2011). Trend is a linear trend in time, while Treated identifies the Italian market. The coefficient associated to the interaction Trend × Treated captures the deviation in the trend of retail prices in the treatment group over and above the one of the control group. The sample used for estimation includes books that sell at least one unit for 80% of the months since its publication date. Bootstrapped standard errors (100 replications) in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations based on the GfK POS data.

Table A2 estimates the parallel trend non-parametrically by interacting the treatment with time indicators. In all specifications, we reject that pre-FBP interactions are jointly equal zero. However, the coefficients are again small, especially when compared to the post-treatment effects, as we can see in Figure 2.

TABLE A2: NON-PARAMETRIC PARALLEL TREND TEST ON RETAIL PRICES

Sample	(1) All data	(2) CB+EC	(3) IB	(4) All data	(5) CB+EC	(6) IB
Jan 2009 × Treated	-	-	-	-	-	-
Feb 2009 × Treated	-0.022*** (0.007)	-0.029*** (0.007)	0.005 (0.015)	-0.023*** (0.001)	-0.029*** (0.001)	0.004*** (0.001)
Mar 2009 × Treated	-0.005 (0.007)	-0.008 (0.008)	0.003 (0.014)	-0.005*** (0.001)	-0.007*** (0.001)	0.003* (0.001)
Apr 2009 × Treated	-0.029*** (0.006)	-0.038*** (0.008)	0.005 (0.016)	-0.027*** (0.001)	-0.036*** (0.001)	0.008*** (0.002)
May 2009 × Treated	-0.005 (0.007)	-0.006 (0.007)	-0.003 (0.015)	-0.002** (0.001)	-0.003** (0.001)	-0.000 (0.001)
June 2009 × Treated	-0.035*** (0.006)	-0.043*** (0.007)	-0.007 (0.015)	-0.032*** (0.001)	-0.041*** (0.001)	-0.004*** (0.001)
July 2009 × Treated	-0.026*** (0.006)	-0.032*** (0.007)	-0.011 (0.014)	-0.026*** (0.001)	-0.032*** (0.001)	-0.008*** (0.001)
Aug 2009 × Treated	-0.024*** (0.007)	-0.029*** (0.007)	-0.016 (0.015)	-0.019*** (0.001)	-0.023*** (0.001)	-0.008*** (0.001)
Sep 2009 × Treated	-0.001 (0.006)	0.000 (0.007)	-0.005 (0.014)	0.003*** (0.001)	0.005*** (0.001)	-0.003** (0.001)
Oct 2009 × Treated	0.018*** (0.007)	0.020*** (0.007)	-0.001 (0.015)	0.020*** (0.001)	0.023*** (0.001)	-0.000 (0.001)
Nov 2009 × Treated	0.013** (0.007)	0.013* (0.007)	0.004 (0.015)	0.009*** (0.001)	0.011*** (0.001)	-0.000 (0.002)
Dec 2009 × Treated	-0.006 (0.006)	-0.008 (0.007)	0.008 (0.015)	-0.008*** (0.001)	-0.009*** (0.001)	-0.000 (0.001)
Jan 2010 × Treated	-0.000 (0.007)	-0.004 (0.007)	0.017 (0.014)	-0.002** (0.001)	-0.004*** (0.001)	0.010*** (0.002)
Feb 2010 × Treated	0.002 (0.006)	-0.002 (0.006)	0.010 (0.015)	-0.004*** (0.001)	-0.007*** (0.001)	0.003** (0.001)
Mar 2010 × Treated	0.000 (0.007)	-0.001 (0.007)	-0.002 (0.015)	-0.003*** (0.001)	-0.002 (0.001)	-0.008*** (0.001)
Apr 2010 × Treated	-0.001 (0.006)	-0.005 (0.007)	0.006 (0.016)	-0.002** (0.001)	-0.003*** (0.001)	-0.004*** (0.001)
May 2010 × Treated	0.002 (0.006)	0.001 (0.006)	0.007 (0.014)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)
June 2010 × Treated	-0.007 (0.007)	-0.011* (0.007)	0.005 (0.014)	-0.007*** (0.001)	-0.010*** (0.001)	0.002* (0.001)
July 2010 × Treated	-0.001 (0.006)	-0.004 (0.007)	0.006 (0.015)	-0.001 (0.001)	-0.002* (0.001)	-0.002 (0.001)
Aug 2010 × Treated	-0.015*** (0.006)	-0.023*** (0.007)	0.009 (0.014)	-0.009*** (0.001)	-0.014*** (0.001)	0.012*** (0.001)
Sep 2010 × Treated	-0.000 (0.006)	-0.005 (0.007)	0.007 (0.013)	0.006*** (0.001)	0.005*** (0.001)	0.001 (0.001)
Oct 2010 × Treated	0.004 (0.006)	0.002 (0.007)	0.000 (0.014)	0.007*** (0.001)	0.010*** (0.001)	-0.008*** (0.001)
Nov 2010 × Treated	0.024*** (0.006)	0.022*** (0.006)	0.013 (0.012)	0.023*** (0.001)	0.027*** (0.001)	-0.001 (0.002)
Dec 2010 × Treated	0.001 (0.007)	-0.003 (0.007)	0.009 (0.014)	0.002* (0.001)	0.002* (0.001)	-0.004*** (0.001)
Jan 2011 × Treated	0.022*** (0.006)	0.020*** (0.007)	0.020 (0.014)	0.023*** (0.001)	0.026*** (0.001)	0.010*** (0.001)
Feb 2011 × Treated	-0.015** (0.006)	-0.028*** (0.006)	0.029** (0.014)	-0.017*** (0.001)	-0.025*** (0.001)	0.016*** (0.002)
Time FE	YES	YES	YES	YES	YES	YES
Market FE	YES	YES	YES	YES	YES	YES
ISBN FE				YES	YES	YES
χ^2 test : H_0 Coef. jointly equal to zero	465.44***	430.41***	36.18*	13,639.17***	20,021.95***	1,454.61***
Observations	1,785,635	1,405,508	380,127	1,785,635	1,405,508	380,127

Notes: This table presents estimated coefficients from a parallel trend test for retail prices in which time dummies are interacted with the treatment identifier in the pre-treatment period (January 2009-February 2011). Treated identifies the Italian market. The first interaction is excluded to avoid multicollinearity. The sample used for estimation includes books that sell at least one unit for 80% of the months since its publication date. Bootstrapped standard errors (100 replications) in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations based on the GfK POS data.

Table A3 focuses on identical books sold both in the Italian and Swiss markets. Despite the drastic reduction in the sample size, results still show an average price increase of about 5% in the IB channel. Results from the CB+EC channel suggest either small or null effects from the introduction of FBP. Both sets of results are in line with our main specification in Table 2.

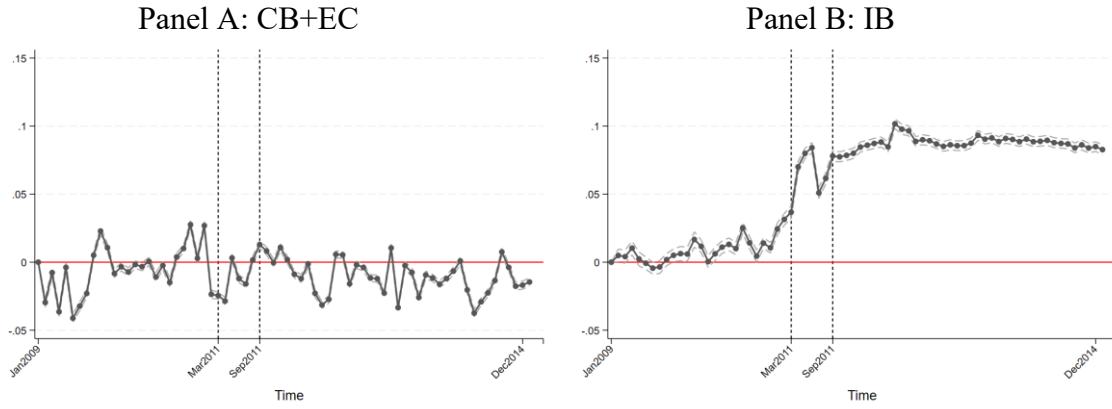
TABLE A3: PRICE EFFECTS COMPARING SAME BOOKS IN THE TWO MARKETS

	(1)	(2)	(3)	(4)	(5)	(6)
	Both markets			Both markets and channels		
Sample	All data	CB+EC	IB	All data	CB+EC	IB
Mid $\times$ Treated	0.015*** (0.004)	-0.007 (0.006)	0.046*** (0.007)	0.041*** (0.004)	0.026*** (0.006)	0.044*** (0.007)
Post $\times$ Treated	-0.004 (0.003)	-0.036*** (0.004)	0.051*** (0.004)	0.035*** (0.004)	0.015*** (0.005)	0.049*** (0.006)
Time FE	YES	YES	YES	YES	YES	YES
Market FE	YES	YES	YES	YES	YES	YES
ISBN FE	YES	YES	YES	YES	YES	YES
Observations	189,675	121,471	68,204	178,502	110,681	67,821

Notes: This table presents the effects of FBP on retail prices when we restrict the sample to books (identified by their ISBN) selling in both the Italian and Swiss markets (columns 1-3). Columns 4-6 further restrict the sample to books selling in both markets and distribution channels. Bootstrapped standard errors (100 replications) in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors' calculations based on the GfK POS data.

The dynamics of the treatment effects confirm the different price reactions in response to FBP introduction across the channels. Figure A1 plots estimated coefficients from event study models in which the treatment identifier is interacted with time indicators, separately for the two channels. We observe a clear upward shift in price induced by FBP in the IB channel, whereas for CB+EC, we observe a very small negative effect around zero.

FIGURE A1: TREATMENT EFFECT DYNAMICS FOR RETAIL PRICES

Notes: The figure shows event study coefficients with the associated 95% confidence interval. Regressions include interactions between time dummies and treatment identifier, as well as time, market, and ISBN fixed effects. The first interaction (January 2009) is normalized to zero. The sample used for estimation includes books that sell at least one unit for 80% of the months since its publication date. Standard errors are bootstrapped (100 replications).

Source: Authors' calculations based on the GfK POS data.

Table A4 collects the results from different sample selections. Columns 1-3 show DiD estimates from the full sample, that is the universe of books sold in Italy or Switzerland. In this case, the estimates suggest an overall negligible effect. However, as discussed in the main text, this specification is contaminated by the entry and exit of books around the regulation. Columns 4-6 focus on books with a sufficient amount of sales (at least 100 units in Italy and 50 in Switzerland) throughout the book lifetime. The large reduction in the number of observations compared to Columns 1-3 confirms that low-sale books are a serious concern. We find an overall positive price effect arises (+1.3%), mostly driven by the IB channel. Similar results are obtained when we further clean the sample by constructing a panel of books for which we observe the evolution of retail price around the introduction of FBP. Columns 7-9 focus on books selling at least one unit in each month within a 1-year window around the regulation, while columns 10-12 select books selling at least one unit in each month since the day of publication. In both cases we observe a clear price increase driven by IB. Moreover, we also detect a very small effect in the CB+EC channel.

TABLE A4: PRICE EFFECTS FROM ALTERNATIVE SAMPLING

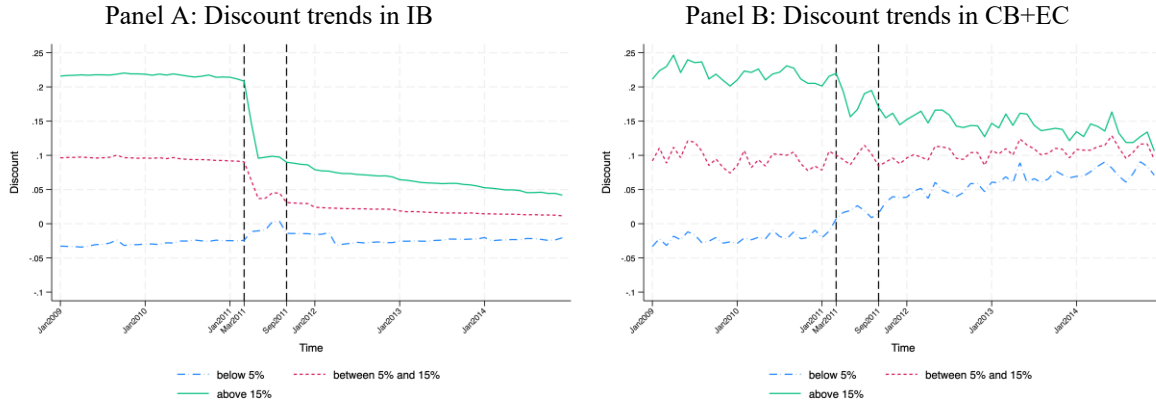
Sample	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Universe of Books			Unit sales higher than 100			Cont. 1-year around FBP			Cont. since publication date		
	All data	CB+EC	IB	All data	CB+EC	IB	All data	CB+EC	IB	All data	CB+EC	IB
Mid × Treated	-0.006*** (0.000)	-0.018*** (0.000)	0.010*** (0.000)	0.005*** (0.000)	-0.012*** (0.000)	0.026*** (0.000)	0.003*** (0.000)	-0.006*** (0.000)	0.047*** (0.001)	0.010*** (0.001)	0.001 (0.001)	0.058*** (0.001)
Post × Treated	-0.005*** (0.000)	-0.025*** (0.000)	0.014*** (0.000)	0.013*** (0.000)	-0.011*** (0.000)	0.031*** (0.000)	0.019*** (0.000)	0.006*** (0.000)	0.074*** (0.001)	0.031*** (0.000)	0.021*** (0.000)	0.083*** (0.001)
Time FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Market FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
ISBN FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	27,032,244	18,668,170	8,364,074	14,746,178	9,539,730	5,206,448	3,409,201	2,808,017	601,184	3,051,746	2,451,494	600,252

Notes: This table presents the effects of FBP on retail for different samples of books. Columns 1-3 use the full dataset, that is the universe of books sold in the Italian and Swiss markets. Columns 4-6 focus on books selling more than 100 (50) units in Italy (Switzerland) throughout their lifetime. Columns 7-9 exploit books with continuous sales during a 1-year window around the regulation. Finally, columns 10-12 make use of books with continuous sales since their publication date. Bootstrapped standard errors (100 replications) in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations based on the GfK POS data.

Figure A2 shows the discounts, by channel, before and after the regulation. Each diagram reports three curves: books with discounts above 15% prior to the regulation (continuous green), those with discounts between 5% and 15% (dashed red), and those with discounts below 5% (dashed blue). While the regulation affected in principle directly only the first class, it is clear that it had an impact on every other discount class. The range of discounts decreased considerably over time. This is what we call “discount convergence” in the main text (Section 4.1.1).

FIGURE A2: EVOLUTION OF DISCOUNTS BY CHANNEL



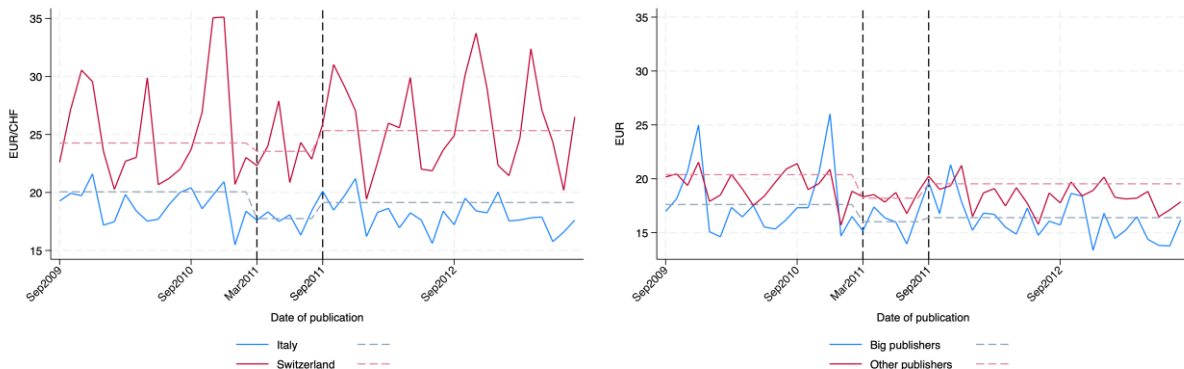
Notes: The figure shows the monthly average discount across books with different discount levels before the introduction of FBP in Italy in IB (Panel A) and CB+EC (Panel B). The sample used for these statistics includes books published before regulation and selling at least one unit for 80% of the months since their publication date.

Source: Authors’ calculations based on the GfK POS data.

The next set of figures and tables should be read as providing supporting evidence for Table 3 in the main text. Figure A3 shows cover prices of books in Italy and Switzerland (Panel A) and, within Italy, of large and small publishers (Panel B). Tables A5-A6 provide statistical tests for the parallel trend for cover prices. Table A5 shows no difference in the (linear) trends of cover prices before FBP between treatment and control group. Table A6 provides a non-parametric test showing interaction coefficients that are generally not statistically significant in the pre-FBP period. Finally, Figure A4 displays the dynamics of the treatment effect on cover prices showing no difference between treatment and control groups both before and after FBP.

FIGURE A3: EVOLUTION OF BOOK COVER PRICES

Panel A: Book cover prices in Italy & Switzerland Panel B: Book cover prices in Italy (big vs. other publishers)



Notes: The figure shows the monthly average cover price for the universe of books published in Italy within a two-year window around the introduction of FBP. In Panel A, the comparison group includes books published in Switzerland by non-Italian Swiss publishers. Panel B compares cover price for books published by big publishers *versus* all the others within the Italian market.

Source: Authors’ calculations based on the GfK POS data.

TABLE A5: LINEAR PARALLEL TREND TEST ON COVER PRICES

Sample	(1) ITALY & SWITZERLAND	(2)	(3)	(4)	(5)
				ITALY	
Trend	-0.006* (0.003)	-0.003 (0.003)	-0.001 (0.002)	0.000 (0.000)	0.000 (0.000)
Trend × Treated	0.004 (0.004)	0.002 (0.003)	0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)
Date of publication FE	YES	YES	YES	YES	YES
Market FE	YES	YES	YES		
Genre IV FE		YES	YES		YES
Publisher FE			YES	YES	YES
Observations	90,632	90,632	90,143	83,213	83,213

Notes: This table presents estimated coefficients from a test of parallel trends for cover prices between treatment and control group in the pre-treatment period (September 2009-February 2011). Trend is a linear trend in time (date of publication). In columns 1-3 the treatment group includes books published in Italy, whereas the control group includes books published in Switzerland by Swiss-German or Swiss-French publishers. In the last two columns the treatment group includes books published by large publishers in Italy, whereas the control group includes books published by small publishers in Italy. The coefficient associated to the interaction Trend × Treated captures the deviation in the trend of cover prices in the treatment group over and above the one of the control group. Standard errors clustered by publisher in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations based on the GfK POS data.

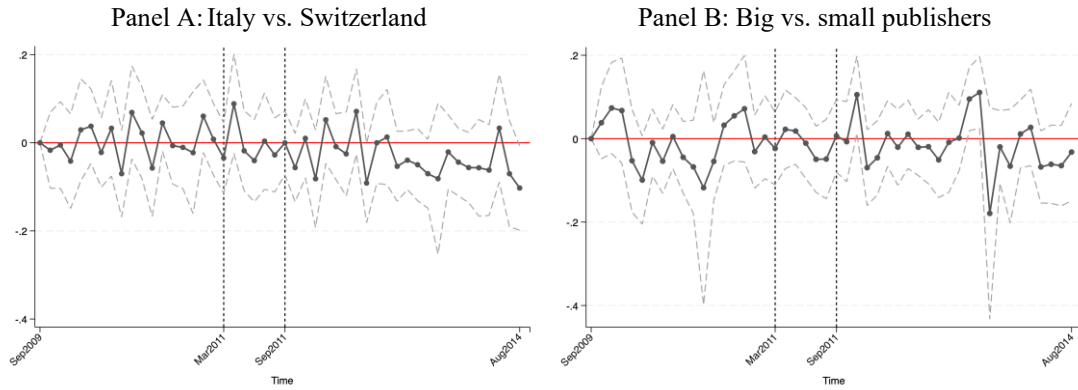
TABLE A6: NON-PARAMETRIC PARALLEL TREND TEST ON COVER PRICES

	(1)	(2)	(3)	(4)	(5)
Sample	ITALY & SWITZERLAND		ITALY		
Sep 2009 × Treated	-	-	-	-	-
Oct 2009 × Treated	-0.165* (0.088)	-0.085 (0.063)	-0.005 (0.046)	0.023 (0.052)	0.027 (0.047)
Nov 2009 × Treated	-0.249*** (0.085)	-0.104 (0.066)	-0.011 (0.051)	0.057 (0.062)	0.061 (0.059)
Dec 2009 × Treated	-0.123 (0.152)	-0.130 (0.100)	-0.015 (0.057)	0.096 (0.078)	0.088 (0.070)
Jan 2010 × Treated	0.099 (0.183)	0.078 (0.136)	0.047 (0.057)	-0.056 (0.068)	-0.057 (0.063)
Feb 2010 × Treated	0.109 (0.091)	0.045 (0.068)	0.049 (0.043)	-0.133** (0.064)	-0.106** (0.054)
Mar 2010 × Treated	0.045 (0.058)	0.042 (0.056)	-0.025 (0.040)	-0.040 (0.047)	-0.026 (0.045)
Apr 2010 × Treated	-0.021 (0.088)	-0.003 (0.069)	0.040 (0.056)	-0.053 (0.045)	-0.059 (0.040)
May 2010 × Treated	-0.286** (0.119)	-0.175** (0.088)	-0.060 (0.053)	0.012 (0.050)	0.008 (0.043)
June 2010 × Treated	0.199 (0.147)	0.195* (0.112)	0.065 (0.055)	-0.089* (0.053)	-0.060 (0.048)
July 2010 × Treated	0.213* (0.126)	0.160 (0.101)	0.025 (0.052)	-0.092 (0.062)	-0.075 (0.061)
Aug 2010 × Treated	-0.003 (0.088)	-0.101 (0.070)	-0.044 (0.060)	-0.107 (0.129)	-0.101 (0.129)
Sep 2010 × Treated	0.025 (0.051)	0.040 (0.045)	0.043 (0.034)	-0.058 (0.056)	-0.063 (0.051)
Oct 2010 × Treated	-0.202** (0.092)	-0.077 (0.066)	0.007 (0.045)	0.007 (0.060)	0.014 (0.055)
Nov 2010 × Treated	-0.323*** (0.099)	-0.170** (0.078)	-0.006 (0.049)	0.049 (0.056)	0.047 (0.056)
Dec 2010 × Treated	-0.157 (0.153)	-0.127 (0.132)	0.014 (0.072)	0.112 (0.084)	0.122* (0.063)
Jan 2011 × Treated	0.087 (0.166)	0.099 (0.102)	0.060 (0.047)	-0.038 (0.061)	-0.033 (0.051)
Feb 2011 × Treated	0.098 (0.081)	0.006 (0.062)	0.018 (0.043)	-0.020 (0.057)	-0.010 (0.054)
Date of publication FE	YES	YES	YES	YES	YES
Market FE	YES	YES	YES		
Genre IV FE		YES	YES		YES
Publisher FE			YES	YES	YES
F-test H_0 : Coef. jointly equal to zero	2.61***	1.34	0.89	3.20***	3.56***
Observations	90,632	90,632	90,143	83,213	83,213

Notes: This table presents estimated coefficients from a parallel trend test for cover prices in which date of publication dummies are interacted with the treatment identifier in the pre-treatment period (September 2009-February 2011). In columns 1-3 the treatment group includes books published in Italy, whereas the control group includes all the books published in Switzerland by German or French Swiss publishers. In the last two columns the treatment group includes books published by large publishers in Italy, whereas the control group collects books published by small publishers in Italy. The first interaction is excluded to avoid multicollinearity. Standard errors clustered by publisher in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors' calculations based on the GfK POS data.

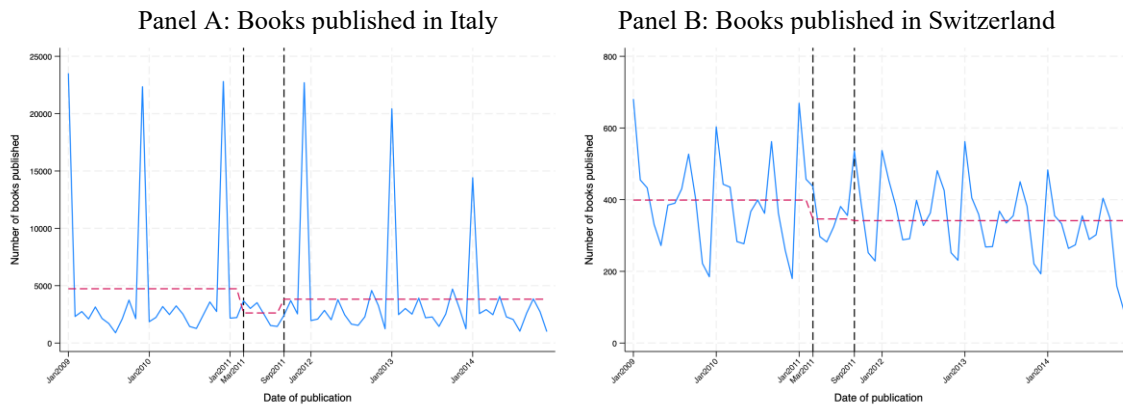
FIGURE A4: DYNAMICS OF THE TREATMENT EFFECT ON COVER PRICE



Notes: The figure shows event study coefficients with the associated 95% confidence interval. In Panel A, the treatment group includes books published in Italy, whereas the control group is defined by books published in Switzerland by German or French Swiss publishers. The regression includes interactions between date of publication dummies and treatment identifier, as well as date of publication, market, genre IV, and publisher fixed effects. In Panel B, the treatment group collects books published by large publishers in Italy, whereas the control group includes books published by small publishers in Italy. In this case date of publication, genre IV, and publisher fixed effects are included in the estimation. The first interaction (September 2009) is normalized to zero. Standard errors clustered by publisher in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations based on the GfK POS data.

Figure A5 shows the number of titles published in Italy and Switzerland over time. The figure can be read alongside Table 4 in the main text.

FIGURE A5: NUMBER OF BOOKS PUBLISHED IN THE TWO MARKETS



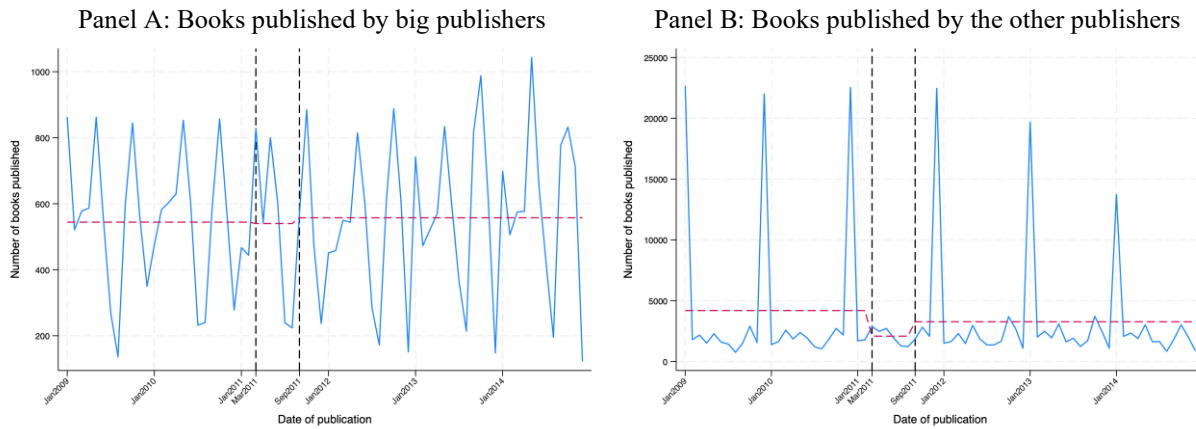
Notes: The figure shows the monthly number of books published in Italy (Panel A) and Switzerland (Panel B) around the introduction of FBP. In Switzerland we count the number of books published by Swiss publishers, but excluding Italian-Swiss publishers to avoid potential contaminations between the two markets.
Source: Authors' calculations based on the GfK POS data.

Figure A6 reports the evolution over time of the number of titles published in Italy, distinguishing between small and large publishers. The figure can be read alongside Table 4 in the main text.

Table A7 presents the effects of FBP on the number of books published, comparing Italy with Switzerland (first two columns) and – within Italy – large and small publishers (last two columns). The estimation is conducted on a balanced panel of 29 genres for both treatment and control groups and restricted to a symmetric two-year window around the regulation to control for the seasonality of book release. *Fiction* is a dummy identifying 4 out of 29 genres (classic literature, contemporary fiction, science fiction, and crime novels). Since publishing a book typically requires several months, short term effects captured by the *Mid* $\times$ *Treated* interaction are not meaningful in this

specification – the term is included for consistency with other all other DiD specifications. The main coefficients of interest are those associated with $Post \times Treated$. Results suggest no significant long-run average variation across genres, nor between fiction and non-fiction books, following the introduction of FBP. See the discussion in Section 4.2.1 in the main text.

FIGURE A6: NUMBER OF BOOKS PUBLISHED IN ITALY BY BIG AND SMALL PUBLISHERS



Notes: The figure shows the monthly number of books published in Italy by big publishers (Panel A) and by the other small publishers (Panel B) around the introduction of FBP.

Source: Authors' calculations based on the GfK POS data.

TABLE A7: IMPACT OF FBP ON BOOK VARIETY ACROSS GENRES

	(1)	(2)	(3)	(4)
Sample	ITALY & SWITZERLAND		ITALY	
Mid $\times$ Treated	-0.093**		0.076	
	(0.042)		(0.047)	
Post $\times$ Treated	-0.036		-0.063	
	(0.044)		(0.040)	
Mid $\times$ Treated $\times$ Non-Fiction		-0.068		0.062
		(0.046)		(0.054)
Mid $\times$ Treated $\times$ Fiction		-0.249***		0.160***
		(0.041)		(0.054)
Post $\times$ Treated $\times$ Non-Fiction		-0.034		-0.040
		(0.049)		(0.038)
Post $\times$ Treated $\times$ Fiction		-0.047		-0.203
		(0.087)		(0.146)
Date of publication-Genre FE	YES	YES	YES	YES
Market-Genre FE	YES	YES		
Big publisher-Genre FE			YES	YES
Observations	2,784	2,784	2,784	2,784

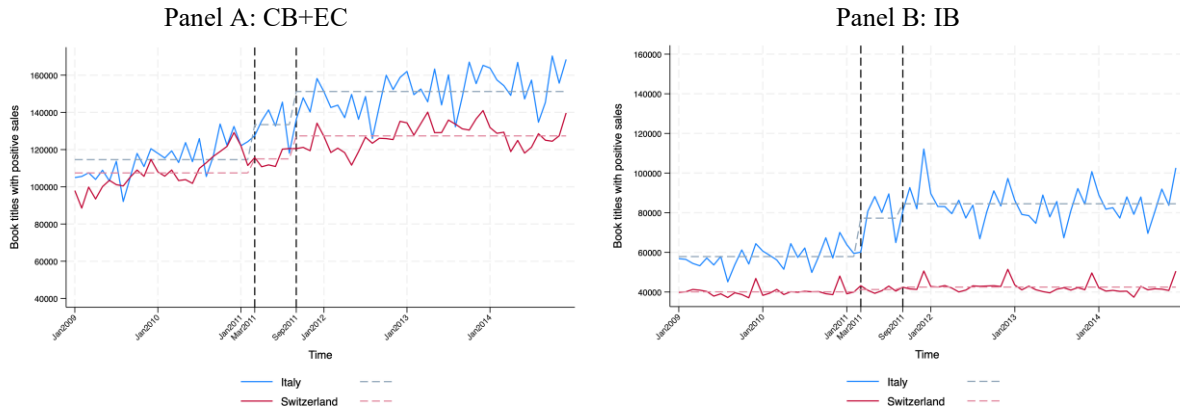
Notes: The table presents the effects of FBP on the number of books published. The dependent variable is the log-number of books published (plus 1) over time (monthly and within a 2-year symmetric window around FBP) across genres (29 categories) and treatment and control groups. In columns 1-2, the treatment group includes books published in Italy, whereas the control group includes books published in Switzerland by Swiss-German or Swiss-French publishers. In columns 3-4 the treatment group includes books published by large publishers in Italy, whereas the control group includes books published by small publishers in Italy. Columns 2 and 4 include further interactions with a dummy identifying fiction books to assess heterogeneous treatment effects. Standard errors clustered by genre (29 clusters) in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors' calculations based on the GfK POS data.

Figure A7 shows the evolution of the number of book titles sold in Italy and Switzerland. The figure can be read alongside Table 5 in the main text.

Table A8 shows the results of the impact of FBP discussed in Section 4.2.2 when we use alternative indexes of concentration. We use the C100 index of concentration for the top 100 book titles (columns 1-3) and the HHI index (i.e., the sum of the square of the sale share of each book; columns 4-6). In both cases, concentration decreases with FBP in the IB channel.

FIGURE A7: NUMBER OF BOOKS SOLD IN THE TWO MARKETS



Notes: The figure shows the evolution of the total number of book titles with positive sales in the two markets (Italy and Switzerland) for each distribution channel.

Source: Authors' calculations based on the GfK POS data.

TABLE A8: IMPACT OF FBP ON SALES CONCENTRATION

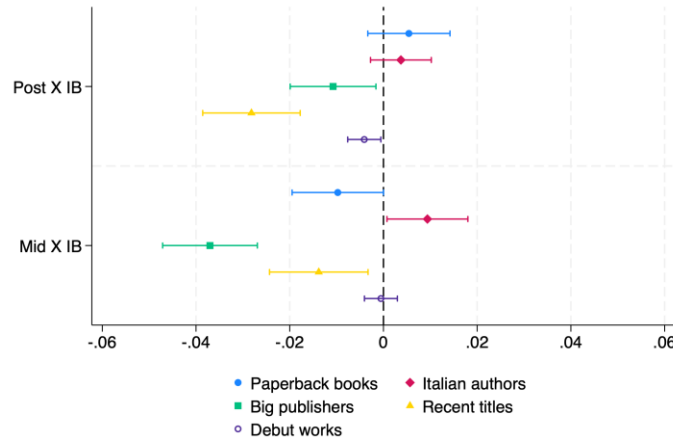
	(1)	(2)	(3)	(4)	(5)	(6)
		C100			HHI	
Sample	All data	CB+EC	IB	All data	CB+EC	IB
Mid $\times$ Treated	-0.0146** (0.007)	-0.0093 (0.011)	-0.0198* (0.011)	-0.0001 (0.000)	-0.0002 (0.000)	-0.0001 (0.000)
Post $\times$ Treated	-0.0035 (0.004)	0.0132* (0.008)	-0.0202*** (0.004)	-0.0000 (0.000)	0.0000 (0.000)	-0.0001** (0.000)
Time FE	YES	YES	YES	YES	YES	YES
Market FE	YES	YES	YES	YES	YES	YES
Observations	288	144	144	288	144	144

Notes: This table presents the effects of FBP on sales concentration in the book market. In columns 1-3 the dependent variable is the concentration ratio of the top 100 books (in terms of market share), while in columns 4-6 the dependent variable is the Herfindal index. Standard errors robust to heteroskedasticity in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors' calculations based on the GfK POS data.

Figure A8 plots the estimated variation of market shares of IB compared to CB+EC, after the introduction of FBP, across different book characteristics.

FIGURE A8: DIFFERENCE IN VARIETY SOLD BETWEEN IB AND CB+EC ACROSS BOOK CHARACTERISTICS

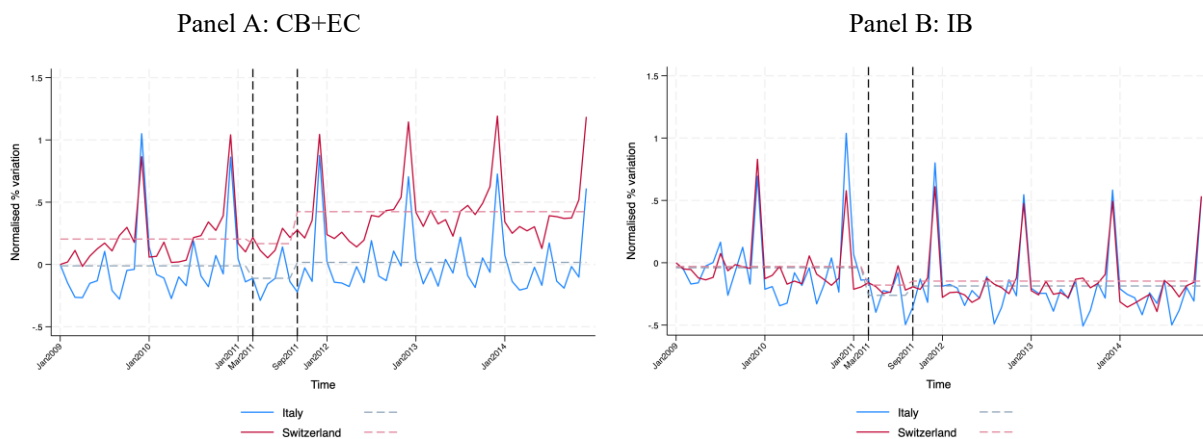


Notes: The figure shows variations in the market shares of different categories of books in IB compared to the baseline CB+EC channel after the introduction of FBP. *Mid* is a dummy that identifies the period between the announcement and the implementation period, while *Post* identifies the post-FBP implementation period. Standard errors are robust to heteroscedasticity.

Source: Authors' calculations based on the GfK POS data.

Figure A9 shows the evolution of aggregate book sales in Italy and Switzerland, separately for the two channels. Table A8 collects the corresponding results of the impact of FBP on aggregate sales.

FIGURE A9: VARIATION OF AGGREGATE SALES IN THE TWO MARKETS



Notes: The figure shows the evolution of the normalized percentage variation in total unit sales in Italy and Switzerland, separately for CB+EC and IB. The baseline period is January 2009.

Source: Authors' calculations based on the GfK POS data.

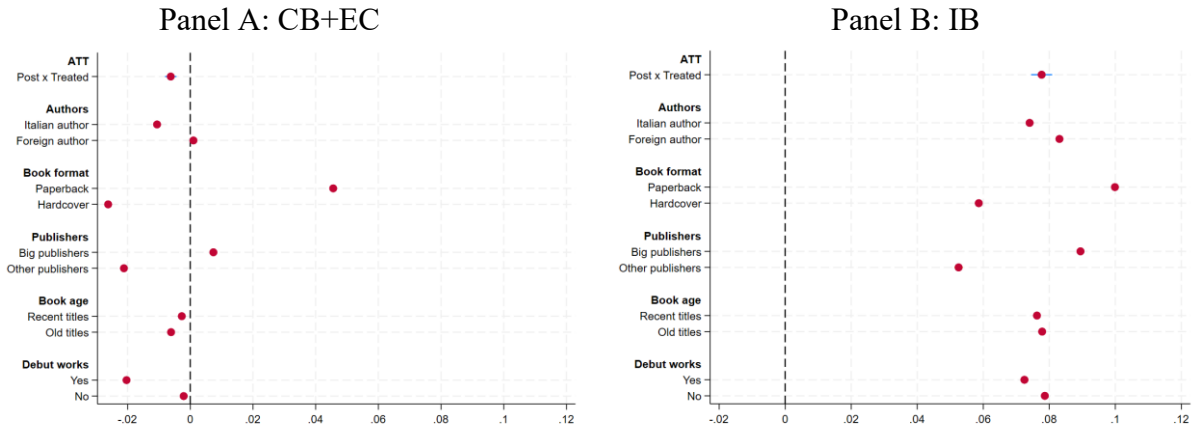
TABLE A9: IMPACT OF FBP ON AGGREGATE SALES

	(1)	(2)	(3)	(4)
Sample	All data	All data	CB+EC	IB
Mid × Treated	-0.080 (0.266)	-0.080 (0.052)	-0.064 (0.053)	-0.096 (0.082)
Post × Treated	-0.086 (0.146)	-0.086** (0.036)	-0.133*** (0.037)	-0.038 (0.044)
Time FE	YES	YES	YES	YES
Market FE	YES	YES	YES	YES
Channel FE		YES		
Observations	288	288	144	144

Notes: This table presents the effects of FBP on aggregate sales in the book market. The dependent variable is the logarithm of total unit sales in the two market (Italy and Switzerland) and distribution channels (CB+EC and IB). *Treated* identifies the Italian market. *Mid* is a dummy taking value 1 in the period between the announcement and the implementation period, while *Post* identifies the post-FBP implementation period. Standard errors robust to heteroskedasticity in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations based on the GfK POS data.

Figure A10 shows heterogeneous treatment effects of FBP on retail prices across different book categories. The full set of estimates are collected in Table A9.

FIGURE A10: HETEROGENEOUS TREATMENT EFFECTS ON RETAIL PRICES

Notes: The figure shows the heterogeneous long-term treatment effects of FBP on retail price, using coefficients from Table A6, along with the 95% confidence intervals. All regressions include time, market, and ISBN fixed effects. The sample used for estimation includes books that sell at least one unit for 80% of the months since its publication date. Standard errors are bootstrapped (100 replications).

Source: Authors' calculations based on the GfK POS data.

TABLE A10: HETEROGENEOUS TREATMENT EFFECTS ON RETAIL PRICE

Sample	(1) All data	(2) CB+EC	(3) IB	(4) All data	(5) CB+EC	(6) IB	(7) All data	(8) CB+EC	(9) IB	(10) All data	(11) CB+EC	(12) IB	(13) All data	(14) CB+EC	(15) IB
Mid × Treated × Italian author	0.005*** (0.000)	-0.009*** (0.000)	0.057*** (0.001)												
Post × Treated × Italian author	0.009*** (0.000)	-0.011*** (0.000)	0.074*** (0.000)												
Mid × Treated × Foreign author	0.005*** (0.000)	-0.008*** (0.000)	0.050*** (0.001)												
Post × Treated × Foreign author	0.022*** (0.000)	0.001*** (0.000)	0.083*** (0.000)												
Mid × Treated × Paperback				0.010*** (0.000)	-0.010*** (0.001)	0.058*** (0.001)									
Post × Treated × Paperback				0.064*** (0.000)	0.046*** (0.000)	0.100*** (0.000)									
Mid × Treated × Hardcover				0.001 (0.000)	-0.010*** (0.000)	0.049*** (0.001)									
Post × Treated × Hardcover				-0.010*** (0.000)	-0.026*** (0.000)	0.059*** (0.000)									
Mid × Treated × Big publishers							0.009*** (0.000)	-0.010*** (0.000)	0.062*** (0.001)						
Post × Treated × Big publishers							0.031*** (0.000)	0.007*** (0.000)	0.089*** (0.000)						
Mid × Treated × Other publishers							-0.002*** (0.000)	-0.009*** (0.000)	0.037*** (0.001)						
Post × Treated × Other publishers							-0.008*** (0.000)	-0.021*** (0.000)	0.053*** (0.001)						
Mid × Treated × Recent titles										0.009*** (0.001)	-0.004*** (0.001)	0.060*** (0.001)			
Post × Treated × Recent titles										0.015*** (0.000)	-0.003*** (0.000)	0.076*** (0.000)			
Mid × Treated × Old titles										0.004*** (0.000)	-0.010*** (0.000)	0.053*** (0.001)			
Post × Treated × Old titles										0.014*** (0.000)	-0.006*** (0.000)	0.078*** (0.000)			
Mid × Treated × Debut works													0.001** (0.001)	-0.010*** (0.001)	0.056*** (0.001)
Post × Treated × Debut works													-0.003*** (0.000)	-0.020*** (0.000)	0.072*** (0.001)
Mid × Treated × Other works													0.006*** (0.000)	-0.008*** (0.000)	0.054*** (0.001)
Post × Treated × Other works													0.019*** (0.000)	-0.002*** (0.000)	0.079*** (0.000)
Observations	8,562,293	6,524,442	2,037,851	8,562,293	6,524,442	2,037,851	8,562,293	6,524,442	2,037,851	8,562,293	6,524,442	2,037,851	8,562,293	6,524,442	2,037,851

Notes: The table presents heterogeneous treatment effects of FBP on retail price. *Mid* is a dummy that identifies the period between the announcement and the implementation period, while *Post* identifies the post-FBP implementation period. Estimated coefficients derive from an extension of equation (3) in which *Mid* × *Treated* and *Post* × *Treated* are further interacted with identifiers for book characteristics. All regressions include ISBN, market, and time fixed effects. The sample used for estimation includes books that sell at least one unit for 80% of the months since its publication date. Bootstrapped standard errors (100 replications) in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations based on the GfK POS data.

Appendix B

This appendix reports additional summary statistics about the Italian and the Swiss markets. Table B1 reports the summary statistics for Swiss dataset. Table B2 reports summary statistics of the dataset used for the employment analysis in Section 6. Figure B1 reports the survey results mentioned in Section 6.¹

TABLE B1: SUMMARY STATISTICS FOR THE SWISS MARKET

Variable	Mean	Std. Dev.	Min	Max	Obs
All data					
Unit sales	7.172	46.280	1	30817	12,231,709
Price (CHF)	24.362	20.333	0.010	600	12,231,709
Cover price (CHF)	17.303	17.351	0	3200	12,231,709
Age (monthly)	40.805	43.931	0	299	12,231,709
Paperback	0.236	0.424	0	1	12,231,709
Italian author	0.010	0.098	0	1	12,231,709
CB+EC					
Unit sales	7.281	51.983	1	30817	9,042,304
Price (CHF)	23.947	20.716	0.010	600	9,042,304
Cover price (CHF)	17.727	18.241	0	3200	9,042,304
Age (monthly)	42.892	44.488	0	299	9,042,304
Paperback	0.232	0.422	0	1	9,042,304
Italian author	0.009	0.096	0	1	9,042,304
% of book titles also sold in IB					
	51%				
IB					
Unit sales	6.863	23.510	1	5773	3,189,405
Price (CHF)	25.536	19.156	1	598	3,189,405
Cover price (CHF)	16.102	14.468	0	1990	3,189,405
Age (monthly)	34.886	41.750	0	299	3,189,405
Paperback	0.247	0.431	0	1	3,189,405
Italian author	0.011	0.102	0	1	3,189,405
% of book titles also sold in CB+EC					
	93%				

Notes: The table reports summary statics of our dataset on book sales in Switzerland (overall, and by distribution channel). Data are at the ISBN, time (monthly) and channel (CB+EC, IB) level.

Source: Authors' calculations based on the GfK POS data.

¹ The full survey (in Italian) is available [here](#).

TABLE B2: SUMMARY STATISTICS FOR EMPLOYMENT AND FIRM DATA

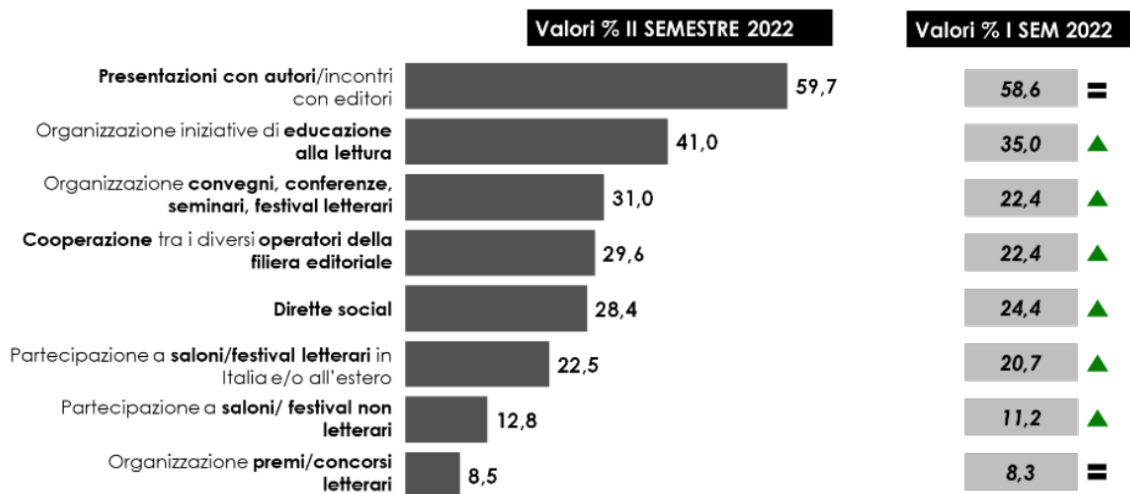
Variable	Mean	Std. Dev.	Min	Max	Obs
Total					
Employees	7526.44	9359.21	877	26076	48
Number of firms	4524.56	7245.05	84	22097	48
1 employee					
Employees	12268.92	10295.82	2388	22633	12
Number of firms	11903.75	10063	2212	22097	12
2-5 employees					
Employees	14642.67	10558.43	3958	26076	12
Number of firms	5906	4433.87	1482	10610	12
6-9 employees					
Employees	1421.92	457.65	877	2016	12
Number of firms	188.92	64.05	114	274	12
>9 employees					
Employees	1772.25	145.62	1492	1966	12
Number of firms	99.58	11.56	84	116	12

Notes: The table shows summary statistics for employment and number of active firms in the bookshop and stationery retail sectors, as identified by their ATECO code, for the period 2009-2014. The data are further disaggregated by firm size, as measured by the number of employees. There are four size classes: 1 employee, 2-5 employees, 6-9 employees, and > 9 employees.

Source: Authors' calculation from the Italian Chambers of Commerce.

FIGURE B1: SURVEY AMONG ITALIAN BOOKSHOPS ABOUT THE INITIATIVES THEY ARE INVOLVED IN

Negli ultimi due anni (2021-2022), la sua libreria ha svolto qualcuna delle seguenti attività?



Base campione: 430 casi. La somma è diversa da 100 perché erano ammesse più risposte. I dati sono riportati all'universo

The data used for the analysis of bookstore reviews and ratings is obtained from multiple sources. First, we acquired a list of active bookshops from illibraio.it, a website owned by one of the main Italian publishers (GeMS), which include reliable information on bookshops' name and address. This list contains 2,350 bookstores. As chain bookshops display regularities in their names, we were able to distinguish independent bookshops (IB) from chain bookshops (CB). Overall, 24% of bookstores in this sample are CB, while 76% are IB.

Second, for each bookstore in our sample, we collected ratings and reviews from Google Reviews. The scraping process was run in September 2024. We obtained up to 6,000 reviews for each bookshop, spanning over 8 years since the scraping date. For each review, we observe the name of the reviewer, a 0-5 rating score, and a text (when present). We performed a basic cleaning by dropping observations with no ratings, as well as bookshops with less than 10 reviews.² Overall, we obtained a dataset of more than 500,000 reviews coming from 372,000 different individuals, which implies that the median reviewer left just one review. On average, bookshops have 260 reviews each. CB receive more reviews than IB (520 reviews on average for CB, while IB have 171), consistent with the fact that CB are usually larger stores compared to IB. However, since there are more IB than CB, the total number of reviews is well-balanced across the two categories.

60% of the individuals left only a rating score, while there are around 213,000 proper reviews with text. We focused on these to find the key topics discussed in the reviews, using ML language models, as described in Appendix C. We find that 82% of the text reviews mentioned one of the key topics previously identified. As the same review can discuss many topics – the average number of topics included in a review is 6, the topic-level dataset expands accordingly. The final topic-level dataset includes 1 million topic-per-review observations. We then associate a sentiment score to each observation to determine positive, negative, or neutral sentiments toward each topic.

Table B3 reports summary statistics of the dataset used for the analysis of customer reviews of bookshops in Section 6.

Figure B2 plots the difference in review ratings of bookshops over time. Time 0 identifies the time when reviews were scraped (September 2024), but the review could have been written several years before. We can analyze reviews up to 2016 (Google Reviews were launched in Italy in 2014, and early data are very scarce). The figure shows that the difference in ratings between IB and CB has been persistent over time.

Figure B3 shows the distribution of sentiments across topics, which generates the results reported in Table 12. Notice that, for nearly every topic, the distribution for IB dominates – in the sense of stochastic dominance – that for CB. The only distribution that is nearly identical is that for prices.

² This results in dropping around 5% of bookshops.

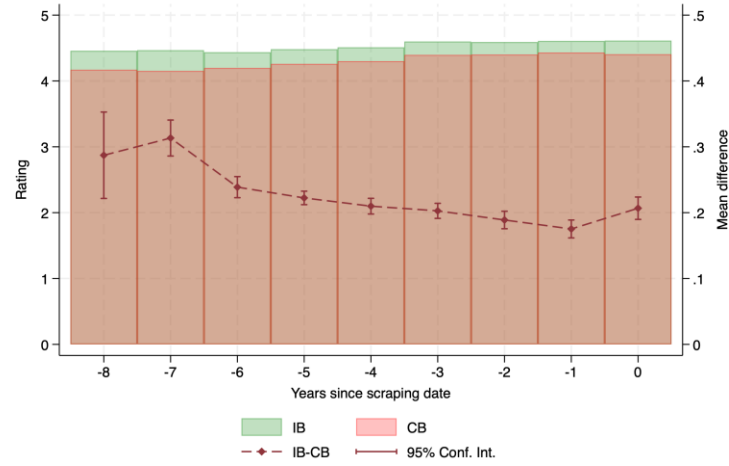
TABLE B3: TOPIC AND SENTIMENT SCORES SUMMARY STATISTICS

Topics	Number of reviews			Percentage of reviews		
	Negative	Neutral	Positive	Negative	Neutral	Positive
Staff						
The role of staff in helping clients: Advice by staff	4967	1528	53252	8%	3%	89%
The role of staff in helping clients: Courtesy of staff	5412	2097	55108	9%	3%	88%
The role of staff in helping clients: Friendly staff	5407	4223	77764	6%	5%	89%
The role of staff in helping clients: Helpful staff	5154	2826	74388	6%	3%	90%
The role of staff in helping clients: Professional/expert staff	5018	1408	52511	9%	2%	89%
The role of staff in helping clients: Quality of the service	5621	2164	55245	9%	3%	88%
The role of staff in helping clients: Suggestions by staff	4953	1434	52523	8%	2%	89%
Product discovery						
Product discovery: Availability of (new) authors	6409	13793	48279	9%	20%	70%
Product discovery: Availability of books	9799	6354	86818	10%	6%	84%
Product discovery: Availability of classics	8544	11090	70155	10%	12%	78%
Product assortment						
Product assortment: Products difficult to find	1672	917	3535	27%	15%	58%
Product assortment: Specialist products available	1916	1893	24594	7%	7%	87%
Product assortment: Well-stocked or organised bookshop	9412	9784	110881	7%	8%	85%
Organization of events						
Organization of events: Availability of armchairs or sofas	631	1533	1855	16%	38%	46%
Organization of events: Availability of coffee shop	4793	4413	16014	19%	17%	63%
Organization of events: Meetings with authors or publishers	4250	4510	11855	21%	22%	58%
Organization of events: Reading groups availability	5550	4780	16385	21%	18%	61%
Pricing						
Pricing: Availability of discounts	3266	2183	9186	22%	15%	63%
Pricing: Buy one get one free or half-price offers	3264	3213	7242	24%	23%	53%
Pricing: Cheap or expensive prices	3495	2022	7565	27%	15%	58%
Pricing: Reduced or discounted prices	2979	1805	9333	21%	13%	66%

Notes: The table reports the distribution of reviews across topics and sentiment scores. Topic definition and methodology for review allocation are described in Appendix C.

Source: Authors' calculation from Google Reviews on a sample of more than 2,250 bookshops in Italy.

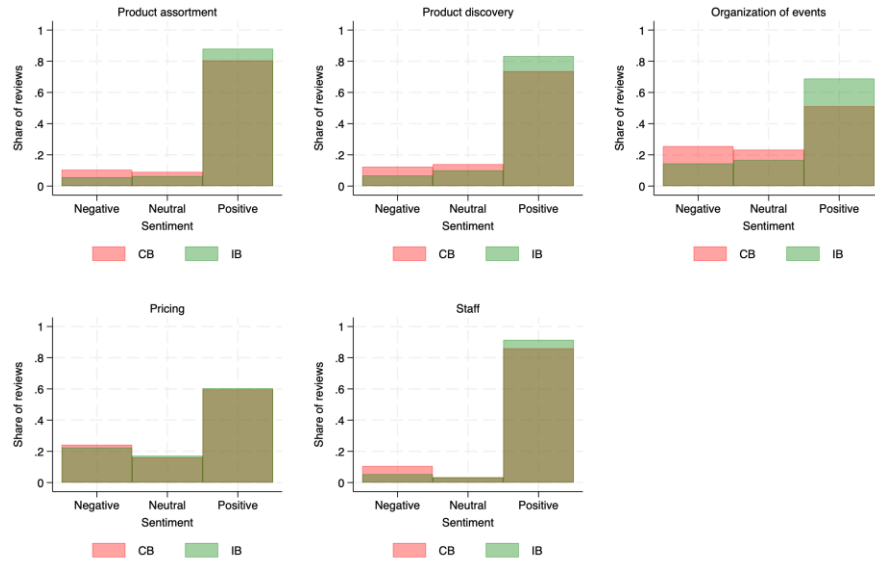
FIGURE B2: DIFFERENCE IN MEAN RATINGS OVER TIME



Notes: The figure shows the evolution of mean rating over time. The left-hand side y-axis measures mean ratings for independent (IB) chain (CB) bookshops. The right-hand side y-axis shows the difference in the average score between IB and CB. Date 0 is the scraping date (September 2024).

Source: Authors' calculation from Google Reviews on a sample of more than 2,250 bookshops in Italy.

FIGURE B3: SENTIMENT OVER TOPICS



Notes: The figure shows the distribution of sentiment scores for five macro-topics described in Table B3, separately for independent (IB) chain (CB) bookshops. Topic definition and methodology for review allocation are described in Appendix C.

Source: Authors' calculation from Google Reviews on a sample of more than 2,250 bookshops in Italy.

Appendix C

C.1 Methodology for the identification of Italian authors

We describe the machine learning (ML) model used to predict whether authors are Italian, based on their names. We use two distinct datasets, one for the Italian book market, and one for the Swiss market. Each of these is separately used for both training and prediction. We use 80% of data for training the model, and 20% for testing it. The algorithm is then organized in three steps. First, it is trained on a subset of the data. Second, after training the model, we test its accuracy on another small sub-sample of the data. Third, we apply the prediction model to the entire set of authors in the datasets. Each of the three steps is run separately in the Italian and Swiss datasets.

More in detail, we start by creating an “Italian” identifier for a subset of authors in our datasets. For both the Italian and Swiss dataset, we selected a 14% random sample from the full list of authors. Then, we manually generated a dummy that identifies Italian authors in the sample. This information feeds the algorithm, allowing the ML model to learn which names are Italian and which are not.

Each author’s name can be seen as a collection of terms. We use Python’s TfidfVectorizer to compute *term-frequency-inverce-document-frequency* (tf-idf) scores associated to each term in authors’ name. The tf-idf score measures how important each term is based on its frequency in the name and across the entire dataset. During the training phase, a logistic regression model assigns weights to terms. Each weight represents the importance of each term in determining whether an author is Italian or not. The model predicts the log-probability that an author is Italian using the following regression:

$$\hat{y} = w_0 + \sum_{i=1}^n w_i x_i,$$

where w_i are the weights associated to each term and x_i are the tf-idf scores for each term in the name. The estimated $\hat{w}_i$ are then used to predict the likelihood that an author is Italian:

$$P(y = 1|x_1, x_2, \dots, x_n) = \frac{1}{1 + e^{-(\sum_{i=1}^n w_i x_i)}}$$

If the likelihood is greater or equal than 50%, the model identifies the author as Italian. The precision of the model is 94% in the Italian dataset, and 96% in the Swiss dataset.

C.2 Topic and stance detection methodology

In our analysis of bookstore reviews in Section 6, we implemented a systematic approach to detect topics discussed by customers and assess their sentiments toward these topics. The methodology consists of two main steps: topic detection and stance detection.³

We began by defining a comprehensive set of topics relevant to customer experiences in bookstores. These topics were specified with expanded clarity to capture nuanced aspects, such as:

- *The role of staff in helping clients*: Helpful staff, Friendly staff, Professional/expert staff, Quality of service, Courtesy of staff, Advice by staff, Suggestions by staff.

³ We thank Prashant Garg for implementing this procedure, which draws on Garg and Fetzer (2025).

- *Product discovery*: Availability of books, Availability of (new) authors, Availability of classics.
- *Pricing*: Cheap or expensive prices, Availability of discounts, Reduced or discounted prices, Buy one get one free, Half-price offers.
- *Product assortment*: Well-stocked or organized bookshop, Products difficult to find, Specialist products available.
- *Organization of events*: Meetings with authors or publishers, Reading groups availability, Availability of coffee shop, Availability of armchairs or sofas.

To build topic-term dictionaries, we utilized GPT-4o, a large language model developed by OpenAI, to generate relevant unigrams, bigrams, and trigrams for each topic. For instance, prompts like “Provide a list of bigrams related to the topic of Friendly staff” were used. This process ensured a rich set of terms associated with each topic.

The customer reviews were then pre-processed by converting text to lowercase, removing non-alphabetic characters, and applying lemmatization to standardize word forms. Using the topic-term dictionaries, we classified reviews by checking for the presence of any topic-specific terms within the text. A review was labelled with a topic if it contained any associated terms, allowing for multiple topics per review when applicable.

For reviews identified with specific topics, we conducted stance detection to determine the sentiment expressed by the reviewer toward each topic. We employed OpenAI's GPT-4o-mini model for this task, balancing efficiency and performance for large-scale data.

The model was prompted to classify the sentiment as ‘positive’, ‘negative’, ‘neutral’, or ‘unrelated’, based on the review content related to the given topic. The prompt provided both the topic and the review text to give context, structured as follows:

“You are tasked with analyzing customer reviews for sentiment towards specific topics. For each review provided, determine the sentiment of the review writer towards the given topic. Classify the sentiment as one of the following options: 'positive', 'negative', 'neutral', or 'unrelated'. Only respond with the sentiment label without any additional text.

Topic: '<topic>'

Review: '<review_text>'

What is the sentiment of the review writer towards the topic?”

We processed the reviews in batches to optimize resource utilization and manage API constraints. The model’s responses were parsed to extract sentiment labels, which were then merged back into the main dataset.

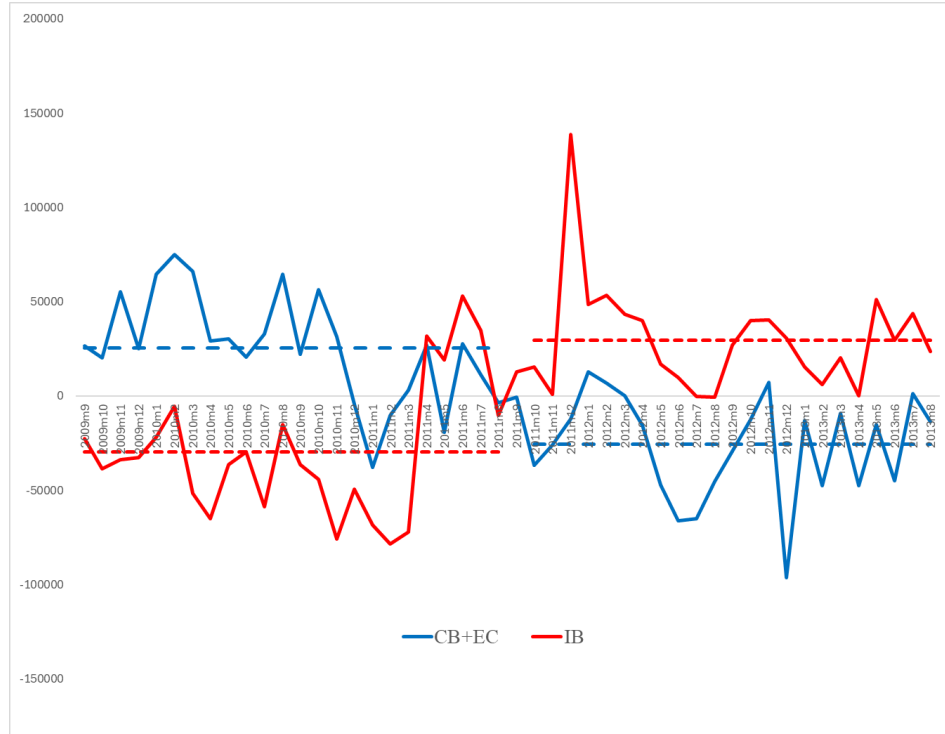
After obtaining sentiment labels for each topic within the reviews, we calculated sentiment scores by aggregating the counts of each sentiment category per topic. Reviews labelled as ‘unrelated’ were excluded to focus on pertinent sentiments. This enabled us to compute the proportion of reviews expressing positive, negative, or neutral sentiments toward each topic, offering insights into customers’ perceptions of various bookstore aspects.

The final dataset integrates the original reviews, detected topics, and corresponding sentiment classifications.

Appendix D

This appendix first plots the residuals from Table 6, column 5 (Section 5.2) and then reports all the demand estimations leading the robustness checks conducted in Section 5.4.

FIGURE D1: DEMAND RESIDUALS BY CHANNEL



Notes: The figure plots the residuals from Table 6, column 5 aggregated by channel (IB versus CB+EC).
Source: Authors' calculations based on the GfK POS data.

TABLE D1: ROBUSTNESS OF DEMAND ESTIMATION (ALTERNATIVE IVs)

Model	(1)	(2)	(3)	(4)	(5)
Dependent variable	OLS Logit $\ln(S_{jt})-\ln(S_{0t})$	IV Logit $\ln(S_{jt})-\ln(S_{0t})$	NL book $\ln(S_{jt})-\ln(S_{0t})$	NL channel $\ln(S_{jt})-\ln(S_{0t})$	NL genre $\ln(S_{jt})-\ln(S_{0t})$
Price	-0.009*** (0.000)	-2.934*** (0.179)	-2.969*** (0.182)	-0.979*** (0.063)	-0.951*** (0.061)
Group segment parameter (σ_g)			-0.588** (0.269)	0.738*** (0.009)	0.824*** (0.010)
Book age	-0.017*** (0.000)	-0.060*** (0.003)	-0.059*** (0.003)	-0.019*** (0.001)	-0.017*** (0.001)
Paperback edition	3.352*** (0.026)	-17.276*** (1.273)	-17.482*** (1.292)	-6.009*** (0.437)	-6.108*** (0.423)
Big publisher	2.476*** (0.015)	4.124*** (0.207)	3.941*** (0.226)	1.200*** (0.077)	0.970*** (0.076)
Post $\times$ IB indicator	0.216*** (0.005)	1.827*** (0.112)	1.799*** (0.115)	0.503*** (0.040)	0.564*** (0.039)
Post	0.054*** (0.006)	-0.488*** (0.049)	-0.468*** (0.051)	-0.179*** (0.017)	-0.215*** (0.016)
IB channel indicator	-1.362*** (0.005)	2.488*** (0.246)	1.293** (0.606)	0.272*** (0.085)	1.010*** (0.080)
Observations	29,053,247	29,053,247	29,053,247	29,053,247	29,053,247
Clusters (ISBN)	522,017	522,017	522,017	522,017	522,017
Instruments		Number of top 100 books released each month for the last five months	Number of top 100 books released each month for the last five months	Number of top 100 books released each month for the last five months	Number of top 100 books released each month for the last five months
First stage F-test (price)		93.85	106.81	67.82	65.97
p-value		[0.000]	[0.000]	[0.000]	[0.000]
First stage F-test (segment)			56.62	374.07	364.36
p-value			[0.000]	[0.000]	[0.000]
Number of books with inelastic demand	99.55%	0.02%	0.00%	0.00%	0.00%

Notes: All regressions include a full set of year, month and genre fixed effects. Sanderson-Windmeijer multivariate F test of excluded instruments with the p-values in square parentheses below are reported. Standard errors clustered at the book level to control for autocorrelation and heteroskedasticity are reported in parenthesis below coefficients: *significant at 10%; **significant at 5%; ***significant at 1%.

Source: Authors' calculations based on the GfK POS data.

TABLE D2: ROBUSTNESS OF DEMAND ESTIMATION (BOOK FE)

	(1)	(2)	(3)	(4)
Model	OLS Logit	IV Logit	NL channel	NL genre
Dependent variable	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$
Price	-0.007*** (0.001)	-2.328*** (0.064)	-0.634*** (0.041)	-0.603*** (0.041)
Group segment parameter (σ_g)			0.501*** (0.009)	0.498*** (0.008)
Post $\times$ IB indicator	0.002 (0.005)	1.286*** (0.037)	0.289*** (0.024)	0.334*** (0.023)
Post	0.229*** (0.005)	-0.264*** (0.017)	-0.028*** (0.008)	-0.042*** (0.008)
IB channel indicator	-2.109*** (0.005)	0.685*** (0.078)	-0.739*** (0.042)	-0.337*** (0.039)
Observations	29,053,020	29,053,020	29,053,020	29,053,020
Book (ISBN) FE	yes	yes	yes	yes
Instruments		Number of books released per channel each month for the last 5 months	Number of books released per channel each month for the last 5 months	Number of books released per channel each month for the last 5 months
First stage F-test (price)		1023.9	427.25	421.87
p-value		[0.000]	[0.000]	[0.000]
First stage F-test (segment)			356.69	342.87
p-value			[0.000]	[0.000]
Percentage of books with inelastic demand	99.78%	0.00%	0.03%	0.04%

Notes: All regressions include a full set of year, month and book fixed effects. Sanderson-Windmeijer multivariate F test of excluded instruments with the p-values in square parentheses below are reported. Compared to Table 6, instruments are adjusted to measure the number of new books released monthly, per channel, for the last five months. Standard errors clustered at the book level to control for autocorrelation and heteroskedasticity are reported in parenthesis below coefficients: *significant at 10%; **significant at 5%; ***significant at 1%.

Source: Authors' calculations based on the GfK POS data.

TABLE D3: ROBUSTNESS OF DEMAND ESTIMATION (DROPPING ISBNs WITH EVEN LAST DIGIT)

	(1)	(2)	(3)	(4)	(5)
Model	Drop ISBNs with last digit 0	Drop ISBNs with last digit 2	Drop ISBNs with last digit 4	Drop ISBNs with last digit 6	Drop ISBNs with last digit 8
Dependent variable	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$
Price	-0.662*** (0.045)	-0.496*** (0.036)	-0.624*** (0.044)	-0.470*** (0.035)	-0.694*** (0.046)
Group segment parameter (σ_g)	0.441*** (0.015)	0.508*** (0.012)	0.415*** (0.014)	0.530*** (0.011)	0.460*** (0.015)
Book age	-0.019*** (0.001)	-0.015*** (0.001)	-0.019*** (0.001)	-0.015*** (0.001)	-0.019*** (0.001)
Paperback edition	-2.745*** (0.287)	-1.816*** (0.226)	-2.410*** (0.279)	-1.716*** (0.222)	-3.036*** (0.291)
Big publisher	1.738*** (0.070)	1.488*** (0.056)	1.797*** (0.069)	1.438*** (0.055)	1.724*** (0.073)
Post × IB indicator	0.490*** (0.031)	0.383*** (0.024)	0.466*** (0.029)	0.359*** (0.023)	0.501*** (0.031)
Post	-0.111*** (0.011)	-0.097*** (0.009)	-0.100*** (0.011)	-0.088*** (0.008)	-0.135*** (0.012)
IB channel indicator	0.086* (0.049)	-0.021 (0.039)	0.022 (0.048)	-0.029 (0.038)	0.176*** (0.051)
Observations	26,145,479	26,140,719	26,137,158	26,154,563	26,144,562
Clusters (ISBN)	469,699	469,762	469,740	469,769	469,876
Instruments	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months
First stage F-test (price)	103	100.52	102.79	95.79	106.03
p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
First stage F-test (segment)	198.3	174.86	187.39	166.27	197.73
p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Notes: All regressions include a full set of year, month and genre fixed effects. Sanderson-Windmeijer multivariate F test of excluded instruments with the p-values in square parentheses below are reported. Standard errors clustered at the book level to control for autocorrelation and heteroskedasticity are reported in parenthesis below coefficients: *significant at 10%; **significant at 5%; ***significant at 1%.

Source: Authors' calculations based on the GfK POS data.

TABLE D4: ROBUSTNESS OF WELFARE CALCULATIONS (DROPPING ISBNs WITH EVEN LAST DIGIT, in € m)

Model		(1) Observed	(2) Counterfactual	(3) Δ	(4) $\Delta\%$
Drop ISBNs with last digit 0	Price effect only	2,320	2,359	-39	-1.7%
	Effort effect only	2,445	2,320	125	5.1%
	Total welfare effect	4,764	4,679	86	1.8%
Drop ISBNs with last digit 2	Price effect only	3,320	3,355	-35	-1.1%
	Effort effect only	3,420	3,320	99	2.9%
	Total welfare effect	6,740	6,676	65	1.0%
Drop ISBNs with last digit 4	Price effect only	2,849	2,889	-40	-1.4%
	Effort effect only	2,971	2,849	121	4.1%
	Total welfare effect	5,820	5,738	81	1.4%
Drop ISBNs with last digit 6	Price effect only	3,467	3,500	-33	-1.0%
	Effort effect only	3,559	3,467	92	2.6%
	Total welfare effect	7,025	6,967	59	0.8%
Drop ISBNs with last digit 8	Price effect only	1,945	1,984	-39	-2.0%
	Effort effect only	2,072	1,945	127	6.1%
	Total welfare effect	4,016	3,929	88	2.2%

Notes: The numbers in the table represent the calculation of consumer welfare (in € m) under different counterfactual scenarios as discussed in Section 5.3 of the paper. The different rows correspond to columns 2, 4 and 5 of Table 6.

Source: Authors' calculations based on the GfK POS data and the estimated results from Table 6.

TABLE D6: ROBUSTNESS OF WELFARE CALCULATIONS (DROPPING DIFFERENT GENRES, in € m)

Model		(1) Observed	(2) Counterfactual	(3) Δ	(4) $\Delta\%$
Drop genre IV category 1	Price effect only	3,714	3,750	-36	-1.0%
	Effort effect only	3,817	3,714	103	2.7%
	Total welfare effect	7,530	7,464	66	0.9%
Drop genre IV category 3	Price effect only	3,499	3,536	-37	-1.0%
	Effort effect only	3,605	3,499	106	2.9%
	Total welfare effect	7,104	7,035	70	1.0%
Drop genre IV category 7	Price effect only	552	595	-42	-7.7%
	Effort effect only	736	552	184	25.0%
	Total welfare effect	1,288	1,147	142	11.0%
Drop genre IV category 11	Price effect only	4,912	4,944	-32	-0.7%
	Effort effect only	4,991	4,912	78	1.6%
	Total welfare effect	9,903	9,857	46	0.5%
Drop genre IV category 22	Price effect only	2,693	2,730	-37	-1.4%
	Effort effect only	2,803	2,693	110	3.9%
	Total welfare effect	5,496	5,423	73	1.3%

Notes: The numbers in the table represent the calculation of consumer welfare (in € m) under different counterfactual scenarios as discussed in Section 5.3 of the paper. The different rows correspond to columns 2, 4 and 5 of Table 6.

Source: Authors' calculations based on the GfK POS data and the estimated results from Table 6.

TABLE D5: ROBUSTNESS OF DEMAND ESTIMATION (DROPPING DIFFERENT GENRES)

Model	(1)	(2)	(3)	(4)	(5)
Dependent variable	OLS Logit $\ln(S_{it})-\ln(S_{0t})$	IV Logit $\ln(S_{it})-\ln(S_{0t})$	NL book $\ln(S_{it})-\ln(S_{0t})$	NL channel $\ln(S_{it})-\ln(S_{0t})$	NL genre $\ln(S_{it})-\ln(S_{0t})$
Price	-0.009*** (0.000)	-2.934*** (0.179)	-2.969*** (0.182)	-0.979*** (0.063)	-0.951*** (0.061)
Group segment parameter (σ_g)			-0.588** (0.269)	0.738*** (0.009)	0.824*** (0.010)
Book age	-0.017*** (0.000)	-0.060*** (0.003)	-0.059*** (0.003)	-0.019*** (0.001)	-0.017*** (0.001)
Paperback edition	3.352*** (0.026)	-17.276*** (1.273)	-17.482*** (1.292)	-6.009*** (0.437)	-6.108*** (0.423)
Big publisher	2.476*** (0.015)	4.124*** (0.207)	3.941*** (0.226)	1.200*** (0.077)	0.970*** (0.076)
Post $\times$ IB indicator	0.216*** (0.005)	1.827*** (0.112)	1.799*** (0.115)	0.503*** (0.040)	0.564*** (0.039)
Post	0.054*** (0.006)	-0.488*** (0.049)	-0.468*** (0.051)	-0.179*** (0.017)	-0.215*** (0.016)
IB channel indicator	-1.362*** (0.005)	2.488*** (0.246)	1.293** (0.606)	0.272*** (0.085)	1.010*** (0.080)
Observations	29,053,247	29,053,247	29,053,247	29,053,247	29,053,247
Clusters (ISBN)	522,017	522,017	522,017	522,017	522,017
Instruments		Number of top 100 books released each month for the last five months	Number of top 100 books released each month for the last five months	Number of top 100 books released each month for the last five months	Number of top 100 books released each month for the last five months
First stage F-test (price)		93.85	106.81	67.82	65.97
p-value		[0.000]	[0.000]	[0.000]	[0.000]
First stage F-test (segment)			56.62	374.07	364.36
p-value			[0.000]	[0.000]	[0.000]
Number of books with inelastic demand	99.55%	0.02%	0.00%	0.00%	0.00%

Notes: All regressions include a full set of year, month and genre fixed effects. Sanderson-Windmeijer multivariate F test of excluded instruments with the p-values in square parentheses below are reported. Standard errors clustered at the book level to control for autocorrelation and heteroskedasticity are reported in parenthesis below coefficients: *significant at 10%; **significant at 5%; ***significant at 1%.

Source: Authors' calculations based on the GfK POS data.

TABLE D7: ROBUSTNESS OF DEMAND ESTIMATION (DIFFERENT CONSTANTS ADDED)

	(1)	(2)	(3)	(4)	(5)	(6)
Model	Add 0.00001	Add 0.0001	Add 0.001	Add 0.01	Add 0.1	Add 1
Dependent variable	$\ln(S_{it})-\ln(S_{0t})$	$\ln(S_{it})-\ln(S_{0t})$	$\ln(S_{it})-\ln(S_{0t})$	$\ln(S_{it})-\ln(S_{0t})$	$\ln(S_{it})-\ln(S_{0t})$	$\ln(S_{it})-\ln(S_{0t})$
Price	-0.562*** (0.039)	-0.586*** (0.040)	-0.600*** (0.040)	-0.585*** (0.038)	-0.494*** (0.031)	-0.253*** (0.017)
Group segment parameter (σ_g)	0.528*** (0.011)	0.426*** (0.013)	0.281*** (0.016)	0.070*** (0.019)	-0.243*** (0.020)	-0.747*** (0.018)
Book age	-0.018*** (0.001)	-0.018*** (0.001)	-0.019*** (0.001)	-0.018*** (0.001)	-0.016*** (0.001)	-0.011*** (0.000)
Paperback edition	-2.067*** (0.248)	-2.169*** (0.253)	-2.208*** (0.253)	-2.070*** (0.240)	-1.486*** (0.198)	-0.034 (0.115)
Big publisher	1.698*** (0.061)	1.748*** (0.062)	1.784*** (0.062)	1.775*** (0.058)	1.641*** (0.047)	1.258*** (0.025)
Post $\times$ IB indicator	0.434*** (0.026)	0.445*** (0.027)	0.448*** (0.026)	0.427*** (0.025)	0.349*** (0.020)	0.159*** (0.011)
Post	-0.103*** (0.010)	-0.102*** (0.010)	-0.098*** (0.010)	-0.086*** (0.010)	-0.058*** (0.008)	-0.004 (0.005)
IB channel indicator	-0.053 (0.042)	-0.019 (0.043)	0.020 (0.044)	0.058 (0.043)	0.078** (0.037)	0.061*** (0.022)
Observations	29,053,247	29,053,247	29,053,247	29,053,247	29,053,247	29,053,247
Clusters (ISBN)	522,017	522,017	522,017	522,017	522,017	522,017
Instruments	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months
First stage F-test (price)	109.73	113.31	120.43	136.3	176.7	281.33
p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
First stage F-test (segment)	193.64	203.38	221.09	258.73	359.29	695.54
p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Notes: All regressions include a full set of year, month and genre fixed effects. Sanderson-Windmeijer multivariate F test of excluded instruments with the p-values in square parentheses below are reported. Standard errors clustered at the book level to control for autocorrelation and heteroskedasticity are reported in parenthesis below coefficients: *significant at 10%; **significant at 5%; ***significant at 1%.

Source: Authors' calculations based on the GfK POS data.

**TABLE D8: ROBUSTNESS OF WELFARE CALCULATIONS (DIFFERENT
CONSTANTS ADDED, in € m)**

Model		(1) Observed	(2) Counterfactual	(3) Δ	(4) $\Delta\%$
Add 0.00001	Price effect only	2,514	2,540	-26	-1.0%
	Effort effect only	2,604	2,514	90	3.5%
	Total welfare effect	5,118	5,054	64	1.3%
Add 0.0001	Price effect only	3,158	3,197	-39	-1.2%
	Effort effect only	3,274	3,158	116	3.5%
	Total welfare effect	6,432	6,355	77	1.2%
Add 0.001	Price effect only	4,378	4,433	-55	-1.3%
	Effort effect only	4,522	4,378	145	3.2%
	Total welfare effect	8,900	8,810	90	1.0%
Add 0.01	Price effect only	7,124	7,197	-74	-1.0%
	Effort effect only	7,300	7,124	177	2.4%
	Total welfare effect	14,424	14,321	103	0.7%
Add 0.1	Price effect only	14,134	14,227	-93	-0.7%
	Effort effect only	14,322	14,134	189	1.3%
	Total welfare effect	28,456	28,360	96	0.3%
Add 1	Price effect only	45,806	45,956	-150	-0.3%
	Effort effect only	45,971	45,806	165	0.4%
	Total welfare effect	91,777	91,761	15	0.0%

Notes: The numbers in the table represent the calculation of consumer welfare (in € m) under different counterfactual scenarios as discussed in Section 5.3 of the paper. The different rows correspond to columns 2, 4 and 5 of Table 6.

Source: Authors' calculations based on the GfK POS and the estimated results from Table 6.

**TABLE D9: ROBUSTNESS OF DEMAND ESTIMATION
(BOUNDS APPROACH)**

	(1)	(2)
Model	IV Logit	NL genre
Dependent variable	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$
Price	-1.430*** (0.075)	-0.595*** (0.004)
Group segment parameter (σ_g)		0.434*** (0.001)
Book age	-0.041*** (0.016)	-0.015*** (0.008)
Paperback edition	-6.457*** (0.321)	-2.261*** (0.000)
Big publisher	3.275*** (0.232)	1.866*** (0.000)
Post × IB indicator	0.974*** (0.248)	0.455*** (0.000)
Post	-0.230 (0.206)	-0.062*** (0.000)
IB channel indicator	0.473*** (0.247)	0.087*** (0.003)
Observations	29,053,247	29,053,247
Clusters (ISBN)	522,017	522,017

Notes: All regressions include a full set of year, month and genre fixed effects. Standard errors are calculated based on a bootstrap procedure where we (1) draw with replacement randomly books with different last digit; (2) compute the bound estimator using that sample; (3) repeat steps (1)-(2) for n-times; (4) obtain the sample standard deviation of the different estimates. Standard errors are reported in parenthesis below coefficients: *significant at 10%; **significant at 5%; ***significant at 1%.

Source: Authors' calculations based on the GfK POS data.

TABLE D10: FURTHER ROBUSTNESS OF DEMAND ESTIMATION

Model	(1) NL genre minus 10% of potential market size $\ln(S_{jt}) - \ln(S_{0t})$	(2) NL genre minus 20% of potential market size $\ln(S_{jt}) - \ln(S_{0t})$	(3) NL genre More flexible specification $\ln(S_{jt}) - \ln(S_{0t})$	(4) NL genre New books (first year of publication only) $\ln(S_{jt}) - \ln(S_{0t})$	(5) NL genre Top selling books (above average sales) $\ln(S_{jt}) - \ln(S_{0t})$	(6) IV Logit Placebo Switzerland $\ln(S_{jt}) - \ln(S_{0t})$	(7) NL genre Placebo Switzerland $\ln(S_{jt}) - \ln(S_{0t})$
Dependent variable	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$	$\ln(S_{jt}) - \ln(S_{0t})$
Price	-0.570*** (0.041)	-0.512*** (0.043)	-0.585*** (0.040)	-0.997*** (0.206)	-0.514*** (0.044)	-0.108*** (0.010)	-0.056*** (0.001)
Group segment parameter (σ_g)	0.357*** (0.014)	0.232*** (0.015)	0.426*** (0.013)	0.636*** (0.054)	0.404*** (0.014)		0.962*** (0.002)
Book age	-0.019*** (0.001)	-0.020*** (0.001)	-0.018*** (0.001)	-0.003 (0.002)	-0.018*** (0.001)	-0.007*** (0.000)	-0.000*** (0.000)
Paperback edition	-1.826*** (0.260)	-0.993*** (0.269)	-2.157*** (0.253)	-5.864*** (1.317)	-1.757*** (0.273)	0.160 (0.118)	-0.595*** (0.016)
Big publisher	1.909*** (0.064)	2.185*** (0.066)	1.913*** (0.060)	2.979*** (0.499)	1.290*** (0.049)		
Post × IB indicator	0.451*** (0.027)	0.445*** (0.028)	0.466*** (0.028)	0.542*** (0.117)	0.399*** (0.030)	-0.045*** (0.008)	0.024*** (0.002)
Post	-0.092*** (0.010)	-0.068*** (0.010)	-0.103*** (0.010)	-0.354*** (0.080)	0.010 (0.014)	-0.150*** (0.007)	-0.059*** (0.001)
IB channel indicator	-0.133*** (0.044)	-0.380*** (0.045)	0.050 (0.041)	0.859*** (0.201)	-0.950*** (0.048)	-0.577*** (0.033)	0.143*** (0.006)
Post × IB indicator × Big publisher			-0.093*** (0.024)				
IB indicator × Big publisher			-0.330*** (0.033)				
Observations	29,053,247	29,053,247	29,053,247	4,142,338	15,470,492	43,560,544	43,560,544
Clusters (ISBN)	522,017	522,017	522,017	225,144	486,628	794,258	794,258
Instruments	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months	Number of books released each month for the last 5 months
First stage F-test (price)	99.22	113.31	113.23	12.31	346.52	365.50	365.50
p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
First stage F-test (segment)	181.38	203.38	202.78	12.64	454.23	386.04	386.04
p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Notes: All regressions include a full set of year, month and genre fixed effects. Sanderson-Windmeijer multivariate F test of excluded instruments with the p-values in square parentheses below are reported. Standard errors clustered at the book level to control for autocorrelation and heteroskedasticity are reported in parenthesis below coefficients: *significant at 10%; **significant at 5%; ***significant at 1%.

Source: Authors' calculations based on the GfK POS monthly retail data.

TABLE D11: FURTHER ROBUSTNESS WELFARE CALCULATIONS (in € m)

Model		(1) Observed	(2) Counterfactual	(3) Δ	(4) $\Delta\%$
minus 10% of potential market size	Price effect only	4,015	4,055	-41	-1.0%
	Effort effect only	4,134	4,015	119	2.9%
	Total welfare effect	8,148	8,070	78	1.0%
minus 20% of potential market size	Price effect only	6,387	6,430	-43	-0.7%
	Effort effect only	6,509	6,387	121	1.9%
	Total welfare effect	12,896	12,817	78	0.6%
More flexible specification	Price effect only	3,243	3,271	-28	-0.9%
	Effort effect only	3,348	3,243	105	3.1%
	Total welfare effect	6,591	6,514	77	1.2%
New books (first year of publication only)	Price effect only	402	432	-30	-7.5%
	Effort effect only	480	402	78	16.3%
	Total welfare effect	883	835	48	5.4%
Top selling books (above average sales)	Price effect only	3,871	3,874	-3	-0.1%
	Effort effect only	3,916	3,871	45	1.1%
	Total welfare effect	7,787	7,745	42	0.5%

Notes: The numbers in the table represent the calculation of consumer welfare (in € m) under different counterfactual scenarios as discussed in Section 5.4 of the paper. The different rows correspond to columns 1 - 5 of Table D9.

Source: Authors' calculations based on the GfK POS data and the estimated results from Table D9.

Appendix E A simple model of RPM

In this Annex, we sketch a toy model of RPM. We are aware that the model is extremely stylized and does not capture several important aspects, such as upstream competition among publishers. The purpose is simply to focus the reader's attention on two main features: 1) the predicted impact of RPM on “service effort” and prices, and 2) its differential impact on IB and CB.

To this end, imagine one upstream manufacturer (a “publisher”) that sells its product (a “book”) to two downstream retailers (“bookshops”), who in turn sell the products to final consumers. One bookshop, denoted by 1, is an “independent bookshop” (IB), while the other one, denoted by 2, is a “chain bookshop” (CB) directly owned by the upstream publisher.

Demand for the final goods comes from an adaptation of the Singh and Vives (1984) model. The representative consumer's utility is a symmetric-quadratic function of two final products, q_1 and q_2 sold by each retailer, and a linear function of a numeraire good, m , namely

$$U = (a + e_1 + e_2)(q_1 + q_2) - \frac{1}{2}(q_1^2 + q_2^2 + 2sq_1q_2) + m,$$

where $0 < s < 1$ measures the (inverse of the) degree of product differentiation between the retailers. When $s = 0$ products are independent while when $s = 1$ they are perfect substitutes. With this utility function, final demand for retail product $i \neq j$ is given by

$$q_i = \frac{(1 - s)(1 + e_1 + e_2) - p_i + gp_j}{1 - s^2}.$$

This specification of the utility U has one term that depends on $e_1 + e_2$: these represent the total service efforts exerted by the two downstream retailers. It captures the fact that consumers care about retail services that can match them with books through recommendations, general advice, and so forth. Notice that effort of one retailer affects demand for *all* books in general, to describe the free riding effect.

We assume that these services are noncontractible and costly to each retailer. In particular, the cost of supplying effort e_i is ke_i^2 , where k is a parameter that we will calibrate to always ensure an interior solution (this typically requires that k is “high enough”).

We now study how the upstream manufacturer can affect retail services and prices through RPM. We assume that, if the manufacturer imposes RPM and restricts the retail price to p_i , it must be maintained by both retailers.

The game is one of full information and has three stages (as in Hunold and Muthers, 2017):

- 1) The manufacturer sets a linear wholesale price w to retailer 1 (while retailer 2 is fully integrated with the upstream manufacturer), and fixes the final retail prices p_i , $i = 1, 2$, if RPM is feasible.
- 2) Each retailer chooses the service effort e_i , and sets its own retail price p_i in case there is no RPM.
- 3) Demand is realized.

This game is isomorphic to one where the upstream publisher sets a book cover price p^{BC} , and then a bookshop sets a discount d , so that the retail price is $p = p^{BC} - d$. With RPM, it is simply $d = 0$.

We start first with solving the game without RPM (**NoRPM**).

In stage two, the profit functions for the IB and CB are respectively

$$\pi_1 = (p_1 - w)q_1 - ke_1^2,$$

$$\pi_2 = p_2q_2 + wq_2 - ke_2^2.$$

Each retailer chooses price and effort. The system of four FOCs generates a closed-form solution. Expressions are slightly cumbersome, so we report the stage-2 equilibrium in implicit form

$$p_1 = \frac{(1 + e_1 + e_2)(1 - s)}{2 - s} + w \frac{2 + s^2}{4 - s^2}, p_2 = \frac{(1 + e_1 + e_2)(1 - s)}{2 - s} + w \frac{3s}{4 - s^2},$$

$$e_1 = \frac{p_1 - w}{2k(1 + s)}, e_2 = \frac{p_2 + w}{2k(1 + s)}.$$

These expressions are quite intuitive. The retail price of an IB is higher than that of a CB because the former has to pay a wholesale price, while the latter is integrated. Still, w enters also the expression for p_2 because of strategic complementarity. As for efforts, they increase with the net margin of each book. The integrated CB also takes into account that own effort will benefit sales to the other IB via the wholesale market.

In stage one, the integrated manufacturer sets w to maximize $\pi_2 = p_2q_2 + wq_2 - ke_2^2$ after replacing the equilibrium expressions obtained in stage two. In equilibrium, we get

$$w = \frac{2k}{4k - 1} [1 + (1 - s)kA(k, s)],$$

where $A(k, s) \equiv$

$$\frac{(5 - 4k - s(4k - 1))(8k - 3 + 4s^3k^2 + 2s^2k(2k - 3) + s(3 + 4k))}{9 - 4k - 96k^2 + 128k^3 + 4s^4k^2(3 + 4k) - 4s^3k(5 + 6k - 8k^2) + 3s^2(3 + 12k + 4k^2 + 48k^3) - 2s(9 + 6k + 24k^2 - 128k^3)}.$$

Next, we turn to the game with RPM (**RPM**).

In stage two, prices are set already by the publisher, so what is left is to maximize π_1 and π_2 w.r.t. e_1 and e_2 respectively, resulting in

$$e_1 = \frac{p_1 - w}{2k(1 + s)}, e_2 = \frac{p_2 + w}{2k(1 + s)}.$$

Taking these into account, in stage one the integrated publisher maximizes $\pi_2 = p_2q_2 + wq_2 - ke_2^2$ w.r.t. w and retail prices. We obtain

$$w = \frac{k(1 + s)(1 - s + 2ks + 2ks^2)}{4k(4k - 1) - (1 - s)(k - 2 + 3sk + 4(3 + s)k^2)},$$

$$p_1 = \frac{k(1 + s)(3 - 3s - 4k - 2sk + 2ks^2)}{4k(4k - 1) - (1 - s)(k - 2 + 3sk + 4(3 + s)k^2)},$$

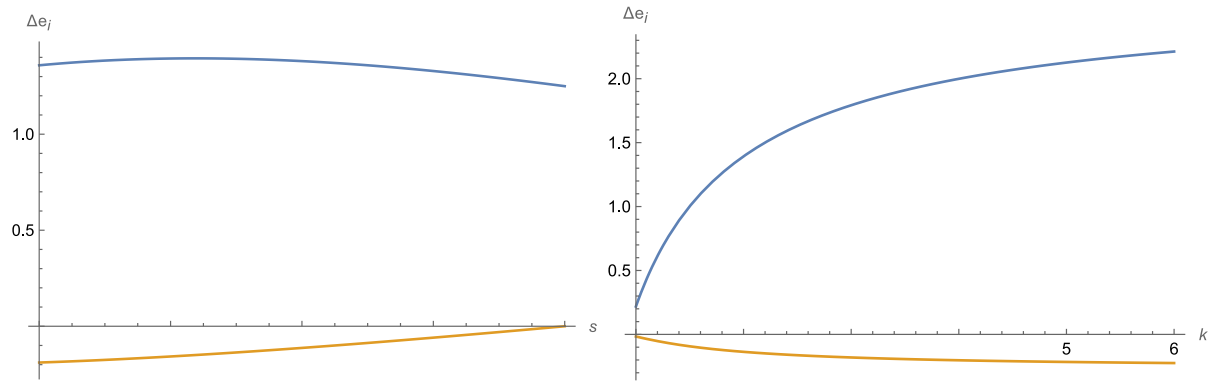
$$p_2 = \frac{k(1 + s)(-1 + s + 2k + 2sk)}{4k(4k - 1) - (1 - s)(k - 2 + 3sk + 4(3 + s)k^2)}.$$

We are now able to compare RPM with NoRPM. Rather than looking at the cumbersome analytical expressions, we plot the results in diagrams that are arguably more informative. We show the differences induced by RPM compared to no RPM. To illustrate the magnitude of the changes, we report the *percentage* difference, namely we report

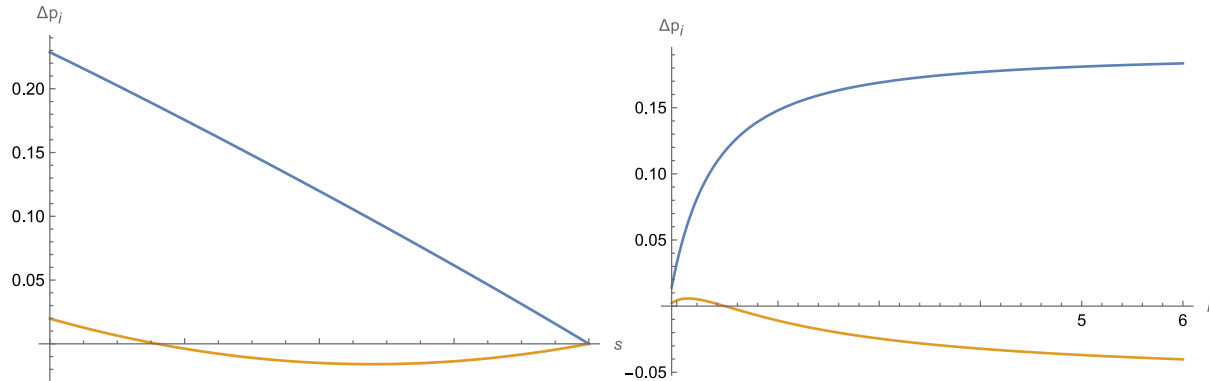
$$\Delta e_i = \frac{e_i^{RPM} - e_i^{NoRPM}}{e_i^{NoRPM}},$$

$$\Delta p_i = \frac{p_i^{RPM} - p_i^{NoRPM}}{p_i^{NoRPM}}.$$

These percentage differences correspond to the DiD estimates of the impact of RPM in our reduced-form evidence. We first plot the percentage impact on effort Δe_1 for the IB (blue line) and Δe_2 for the CB (orange line). In terms of the primitives, we can fix k , and vary substitutability s (left diagram; $k = 2$) or fix s and vary the cost of effort k (right diagram; $s = 0.5$).



Finally, we plot the percentage impact on prices Δp_1 for the IB (blue line) and Δp_2 for the CB (orange line). Again, we can fix k , and vary substitutability s (left diagram; $k = 2$) or fix s and vary the cost of effort k (right diagram; $s = 0.5$).



We do not claim generality of our findings. The purpose of this analysis is simply to show how, in a rather intuitive way, RPM can result in an increase in both the retail price and the service effort of an IB, compared to the absence of RPM. Also, the effects of RPM are instead more muted for the integrated CB. One expects small reductions, both in prices and in service effort, but not always – though the magnitudes are always fairly modest compared to the changes for IB.