

Reproducing estimates of Chas-Amil and Buongiorno "The demand for paper and paperboard - Econometric model for the European Union"

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Chas Amil and buongiorno (2000) estimated demand functions for paper and paperboard products in the European Union (EU15). In the first section, we attempt to reproduce their graphs and estimates for the period 1996-1992, based on FAOSTAT forest products production and trade data and World Bank GDP and deflator data. In a second section we extended the estimation period by 20 years, until 2012. In a third section, we estimated for all EU27 countries but only over the period from 1992 until 2012.

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1 Reproducing Chas Amil and Buongiorno

1.1 Consumption of Paper and Paperboard (1969-1995)

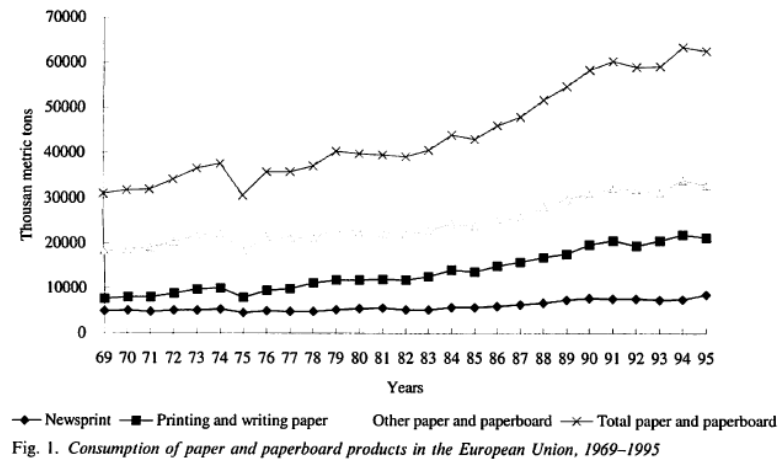


Figure 1: Original chart reproduced from Chas Amil and Buongiorno. Consumption of paper and paperboard products in the European Union (EU15).

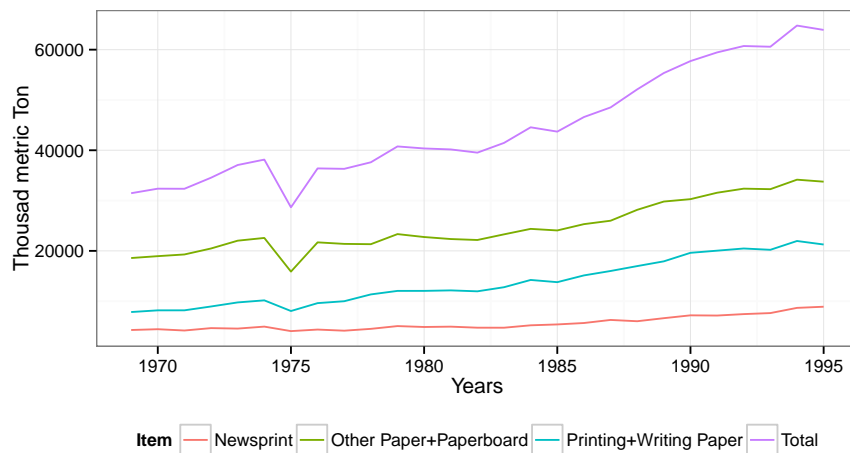


Figure 2: Consumption of paper and paperboard products in EU15, source: FAOSTAT

1.2 Price of paper and paperboard (1969-1995)

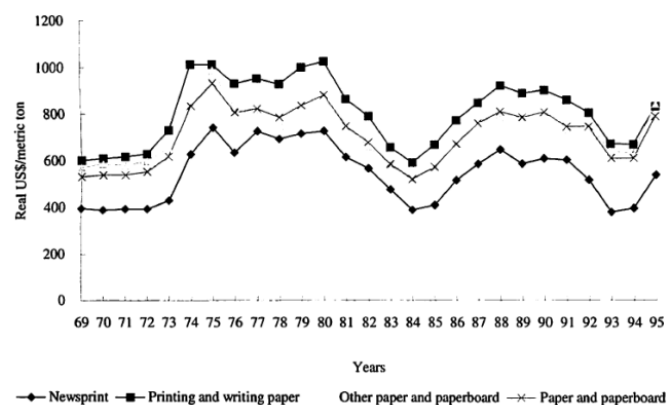


Figure 3: Original chart reproduced from Chas Amil and Buongiorno. Price Evolution of paper and paperboard products in the European Union.

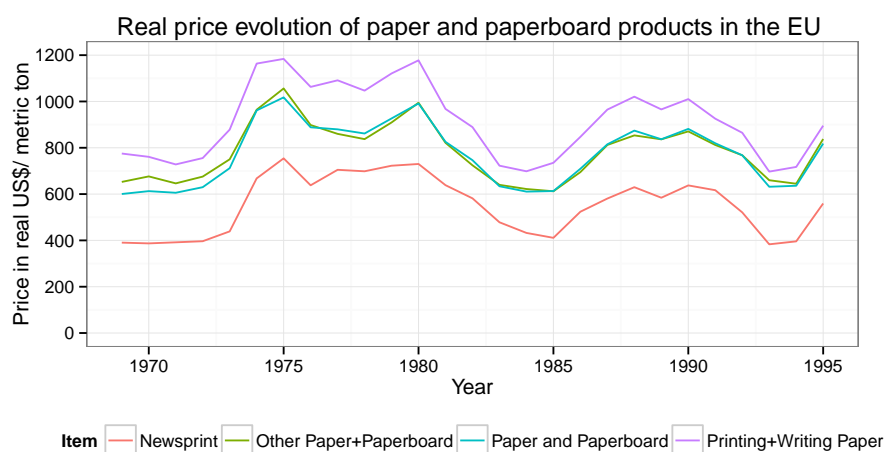


Figure 4: Price evolution of paper and paperboard products in EU15 in USD of 1987, source: FAOSTAT and own calculations.

1.3 GDP and consumption per capita

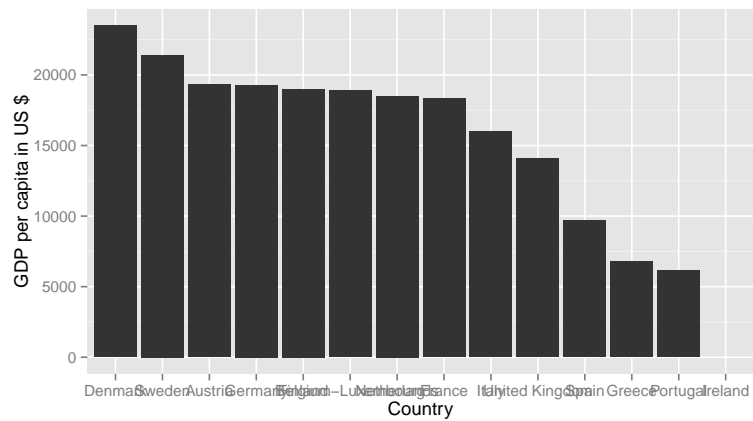


Figure 5: GDP per capita. source: World Bank.

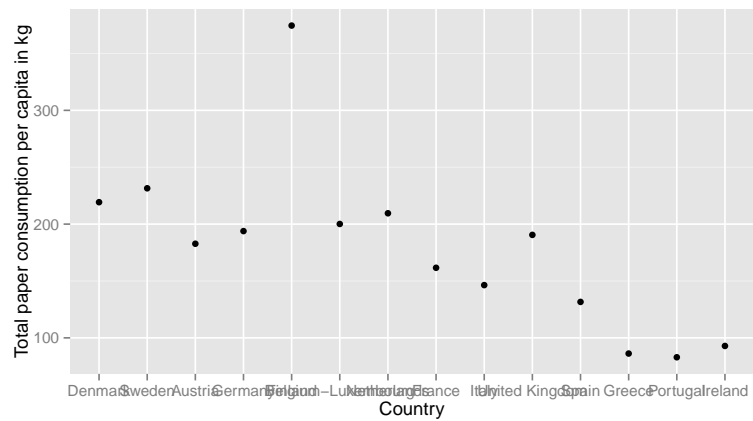


Figure 6: Paper and paperboard Consumption per capita. source: FAOSTAT and own calculations.

1.4 Estimating the model

Because the Worldbank databank doesn't contain a deflator for Ireland over the time period of interest, we couldn't calculate the GDP in constant USD for Ireland.

	Short-term elasticities			R^2	ρ
	Y_t	P_t	D_{t-1}		
Austria	0.48 (0.16)**	-0.45 (0.19)**	0.06 (0.26)	0.61	-0.31 (0.23)
Belgium-Luxemb.	0.27 (0.23)*	-0.25 (0.32)	0.56 (0.19)**	0.52	-0.33 (0.21)
Denmark	0.64 (0.16)**	-0.62 (0.16)**	0.41 (0.15)**	0.83	-0.27 (0.20)
Finland	0.35 (0.17)**	-0.41 (0.21)**	0.27 (0.22)	0.52	-0.04 (0.22)
France	0.25 (0.12)*	-0.28 (0.14)*	0.50 (0.18)**	0.65	-0.31 (0.21)
Germany	0.32 (0.17)*	-0.33 (0.19)*	0.59 (0.18)**	0.81	-0.08 (0.24)
Greece	0.30 (0.21)	-0.22 (0.17)	0.65 (0.12)**	0.76	0.09 (0.22)
Ireland	0.30 (0.11)**	-0.07 (0.14)	0.05 (0.27)	0.45	-0.10 (0.22)
Italy	0.59 (0.14)**	-0.22 (0.10)**	-0.08 (0.23)	0.78	-0.40 (0.18)*
Netherlands	0.46 (0.20)**	-0.46 (0.22)**	0.52 (0.18)**	0.72	-0.48 (0.19)**
Portugal	0.15 (0.18)	-0.03 (0.20)	0.76 (0.18)**	0.72	-0.33 (0.20)
Spain	0.40 (0.11)**	-0.33 (0.10)**	0.45 (0.14)**	0.92	-0.40 (0.21)*
Sweden	0.26 (0.22)	-0.18 (0.25)	0.37 (0.23)	0.34	-0.08 (0.23)
United Kingdom	0.25 (0.13)*	-0.24 (0.13)*	0.34 (0.26)	0.51	-0.24 (0.21)

Note: Standard deviations of the coefficients are in parentheses.

** * = coefficients significantly different from zero at 1% and 5% significance level.

R^2 = coefficient of determination.

ρ = coefficient of autocorrelation, after Cochrane–Orcutt correction.

Table 1: Original table reproduced from Chas Amil and Buongiorno. Estimates of demand equations for total paper and paperboard by country.

[1] "Static model for pooled countries"

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-9.1011	0.4994	-18.22	0.0000
log(GDPconstantUSD)	0.9761	0.0131	74.31	0.0000
log(Price)	-0.2698	0.0668	-4.04	0.0001

	Country	log.GDPconstantUSD.	log.Price.	log.Consum_t_1.	R_Squared
1	Austria	1.53	-0.07	-0.25	0.88
2		0.30	0.10	0.23	
3	Belgium-Luxembourg	1.23	-0.07	0.10	0.88
4		0.30	0.12	0.21	
5	Denmark	0.59	-0.08	0.62	0.84
6		0.25	0.12	0.16	
7	Finland	1.05	-0.17	0.07	0.92
8		0.24	0.08	0.20	
9	France	1.19	-0.48	-0.09	0.57
10		0.32	0.29	0.21	
11	Germany	0.93	-0.11	0.33	0.96
12		0.24	0.06	0.18	
13	Greece	0.69	-0.01	0.64	0.90
14		0.36	0.14	0.16	
15	Italy	1.01	0.02	0.10	0.91
16		0.24	0.07	0.21	
17	Netherlands	0.98	-0.14	0.22	0.92
18		0.25	0.08	0.20	
19	Portugal	0.94	-0.14	0.46	0.92
20		0.32	0.16	0.20	
21	Spain	1.58	-0.10	0.09	0.98
22		0.41	0.05	0.22	
23	Sweden	1.20	-0.07	-0.16	0.76
24		0.27	0.10	0.22	
25	United Kingdom	0.59	-0.13	0.39	0.81
26		0.15	0.07	0.18	

2 Extenting time series until 2012

2.1 Consumption of Paper and Paperboard (1969-2012)

2.2 Price of paper and paperboard (1969-2012)

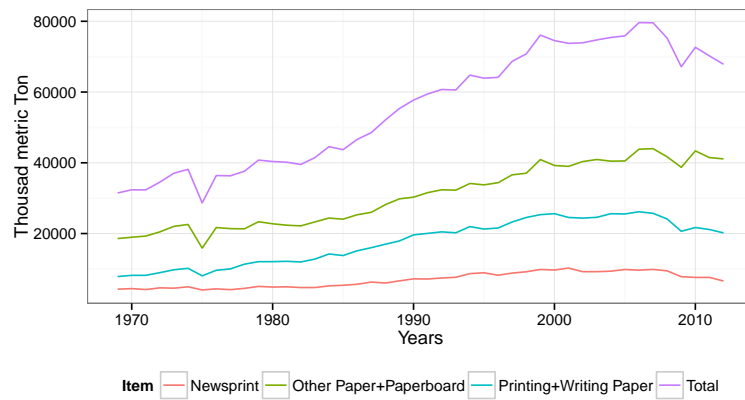


Figure 7: Consumption of paper and paperboard products in EU15, source: FAOSTAT

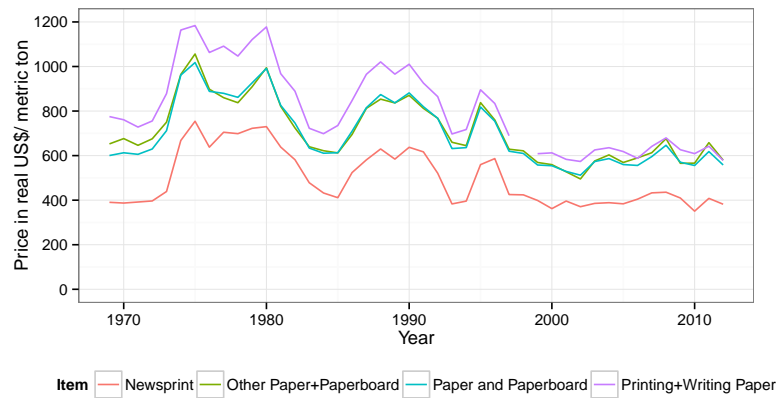


Figure 8: Price evolution of paper and paperboard products in EU15 in USD of 1987, source: FAOSTAT and own calculations