

**The Deterrent Effects of National Anti-Cartel Laws:
Evidence from the International Vitamins Cartel**

Julian L. Clarke

and

Simon J. Evenett*^φ

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Abstract:

We estimate the effect on international trade flows during the 1990s of the formation of the vitamins cartel. By exploiting both variation in trade flows across importing nations and over time, the parameter estimates shed light on whether cartelised products tended to be exported in greater amounts to certain destinations than to others. There is strong evidence that, after the formation of this cartel in 1990, exports from countries where the conspirators were located to those nations in Africa, Europe, and Latin America that did not have anti-cartel laws tended to grow faster than those nations that had such laws. This finding is supportive of the hypothesis that this international cartel particularly targeted nations without an anti-cartel law. Indeed, the extent of such discrimination between export destinations was particularly strong in Europe; perhaps reflecting the fact that the deterrent value of anti-cartel laws in that continent are stronger than those in Africa and Latin America. These findings also have implications for the cost-benefit analyses of anti-cartel laws. Indeed, for 10 developing economies in Africa and Latin America we were able to locate recent estimates of the cost of enforcing their entire competition policy enforcement regime. We compared these implementation costs with the annual reduction in overcharges on vitamins imports that resulted from the lower shipments of vitamins to nations with cartel laws. On the most conservative estimates, we find that in four of these 10 economies the reduction in overcharges on this one international cartel *alone* would have exceeded a quarter of the *entire* government outlays on competition policy enforcement. These findings have a direct bearing on the debate, currently taking place at the World Trade Organisation, on the merits of multilateral disciplines that would require all WTO members to enact and enforce provisions against hard core cartels.

* Clarke and Evenett are, respectively, Research Fellow and Director of Economic Research at the World Trade Institute, Hallerstrasse 6, 3012 Berne, Switzerland.

^φ Corresponding author. Email: simon.evenett@worldtradeinstitute.ch

1. Introduction

During the 1990s the European Commission and the United States' Department of Justice together prosecuted over forty cartels that involved private firms and whose effects went beyond national borders. These private international cartels were found in a wide range of products – from citric acid, vitamins, newsprint, and fax paper to shipping and chemicals such as aluminium phosphide and sodium gluconate (Evenett, Levenstein and Suslow, 2001, Table 1). Furthermore, these cartels tended not to collapse under the weight of their own incentive problems, as 24 of these cartels lasted at least four years. The latter finding suggests that market forces alone may be inadequate to undermine attempts to fix prices, rig bids, allocate quotas, and market shares; so implying a potential role for national anti-cartel enforcement.

The large number of cartels being unearthed in the European Union and the United States has not gone unnoticed in the rest of the world and the competent authorities in other jurisdictions are increasing their anti-cartel enforcement efforts. For example, submissions to the Organisation of Economic Co-operation and Development (OECD) provide details of recent anti-cartel enforcement actions by developing economies (see OECD, 2002a). Moreover, many nations established competition authorities in the 1990s, so much so that the United Nations Conference on Trade and Development (UNCTAD)'s *Directory of Competition Authorities* now contains entries for 93 nations and 3 supranational entities (the Commonwealth of Independent States, the European Commission, and Union Economique et Monetaire Ouest Africaine.) Given that anti-cartel statutes tend to be one of the first competition measures enacted by national authorities, these figures suggest that there is substantial legislative support—if not necessarily the capacity—for anti-cartel enforcement.

The observations in the last two paragraphs raise a number of interesting research questions, with potential implications for policymakers. First, what is the impact of these international cartels on market outcomes (prices, quantities) in different markets and on international trade flows? Second, how large are the rents are created by international cartels? Third, to what extent—if at all—do cartel members take into account the potential for future enforcement actions by national competition authorities when planning and executing their agreements to distort market outcomes? This latter question might shed light on the deterrent effects of national anti-cartel laws and on the potential impact of adopting such a law. This set of questions, which we do not claim is exhaustive, highlights the impact of international cartels and cartel enforcement on market outcomes; and should be distinguished from questions associated with the jurisprudence of anti-cartel laws and legal matters. As will become clear, our focus here is the impact of one major international cartel—that of vitamins—leaving to

others who are more competent to tackle what appears to us as the complex legal issues raised by anti-cartel enforcement.

The international vitamins cartel operated from 1990 to 1999 and involved producers located in Canada, Germany, Japan, Switzerland, and the United States. Using international trade data from 1985 to 1999 we examined, after taking into account the other plausible determinants of trade in vitamins, whether the formation of this cartel had effects for trade in vitamins that differed in systematic ways across importing nations. We were especially interested in evaluating the hypothesis that, while a cartel is in operation, the conspirators will tend to ship relatively fewer goods to those destinations with active anti-cartel enforcement regimes. This hypothesis could be rationalized with the following arguments. First, cartel members will weigh the gains from a further increase in prices in a given nation's market with the probability that such a price increase will catch the eye of that nation's antitrust authority which, in turn, may initiate an investigation that could result in punishments and the break-up of the cartel. Reasoning at the margin, cartel members will set prices so as to equate the marginal benefit of higher profits today with the marginal losses associated with a greater probability of the cartel being broken up in the future. (These losses include foregone cartel revenues plus whatever financial penalties that the antitrust authorities will impose.) The stronger the penalties for cartelization and the greater the probability of a cartel being successfully investigated and prosecuted, the greater the disincentive to cartelise in the first place.

Second, in the international context, where announcements about cartel investigations and prosecutions are likely to be closely watched by other nations' enforcement authorities, cartel members may well deliberately reduce their exports to and sales in jurisdictions whose investigations are watched by others abroad. Such cartel members may prefer to stay "under the radar screen" in jurisdictions with stronger cartel enforcement regimes (such as the United States and Europe); and quietly get on with raising prices in other nations' markets. For both reasons one might expect the total value of cartelized exports to be lower to foreign destinations which have anti-cartel laws than to those that do not.

Turning now to our findings, we found strong evidence that, after the formation of the vitamins cartel in 1990, exports from countries where the cartel conspirators were located to those nations in Africa, Europe, and Latin America that did not have anti-cartel laws tended to grow faster than those nations that did have such laws. This finding is supportive of the hypothesis that the conspirators in this international cartel particularly targeted nations without an anti-cartel law. Indeed, the extent of such discrimination between export

destinations was particularly strong in Europe; perhaps reflecting the fact that the deterrent value of anti-cartel laws in that continent are stronger than those in Africa and Latin America. These findings also have implications for the cost-benefit analyses of anti-cartel laws. Indeed, for 10 developing economies in Africa and Latin America we were able to locate recent estimates of the cost of enforcing their entire competition policy enforcement regime. We compared these implementation costs with the annual reduction in overcharges on vitamins imports that resulted from the lower shipments of vitamins to nations with cartel laws. On the most conservative estimates, we find that in four of these 10 economies the reduction in overcharges on this one international cartel *alone* would have exceeded a quarter of the *entire* government outlays on competition policy enforcement. These findings have a direct bearing on the debate, currently taking place at the World Trade Organisation, on the merits of multilateral disciplines that would require all WTO members to enact and enforce provisions against hard core cartels.

Our analysis departs from the existing literature in a number of respects. To begin with unlike First (2001), who described in illuminating detail the vitamins cartel, our analysis is quantitative and not qualitative. Second, our approach focuses on the implications for international trade flows of international cartels, and so does not examine how within-border (domestic) transactions are affected by cartelisation (O'Connor, 2001, White, 1999). Third, our approach employs econometric tools to identify what impact cartel laws have on the export decisions of cartel members. That is, we examine the impact of such laws having controlled for the other determinants of exports. Fourth, unlike Levenstein and Suslow (2001) who calculate the effects of international cartelisation at a point in time, we use econometric tools to estimate the impact of the vitamin cartel's formation on trade flows through the 1990s.

The remainder of this paper is organised as follows. The next section summarizes the recent discussion on cartels in international fora and highlights how economic research can shed light on a number of the issues being discussed. The third section presents our empirical analysis of the effects of the formation of the vitamin cartel on trade flows and draws out the implications for assessing the costs and benefits of anti-cartel laws. Concluding remarks appear in the fourth section and a technical appendix describes in greater detail the theoretical framework employed, the data collected, and the econometrics undertaken for this study.

2. A selective overview of the ongoing discussions on international competition policy, especially as they relate to international cartels.

Understanding the effects of international cartels on market outcomes has some bearing on certain long-standing debates in international fora about the effects of large companies and about the merits of adopting international disciplines on competition policy. As is often pointed out, one can go back to the debates surrounding the Havana Charter in the 1940s to see concerns raised about the potential for the benefits of international trade reform to be eroded by greater anticompetitive practices. Moreover, concerns about “restrictive business practices” led the United Nations General Assembly to adopt on 5 December 1980 a Set of Multilaterally Agreed Equitable Principles and Rules for the Control of Restrictive Business Practices. This “Set” has been renewed in 1985, 1990, 1995, and 2000; highlighting country concerns in some quarters about the effects of restrictive business practices, of which cartels are a leading example. Many (notably U.S.-based) scholars and officials are, and have been, sceptical about the pervasiveness and effects of restrictive business practices in international commerce; a presumption that was easy to sustain given the little available research on contemporary international cartels. It is, therefore, significant that there have been a number of recent attempts to quantify the effects of cartels that have had international effects (see Levenstein and Suslow, 2001, O’Connor, 2001, and White, 1999) and this paper can be thought of as part of this research program.

In the 1990s the members of the OECD also gave growing attention to what are often referred to now as hard core cartels. Discussions at the OECD covered a wide variety of aspects of anti-cartel enforcement and laws; including the severity of sanctions, role of leniency programs, and the nature and extent of current and potential future international cooperation in anti-cartel enforcement. These discussions, which now routinely include new members, have added greatly to the body of knowledge on cartel enforcement and have provided an opportunity for best practices to be discussed and ideas exchanged. Moreover, on 25 March, 1998, the OECD Council approved a Recommendation Concerning Effective Action Against Hard Core Cartels which

“calls upon countries to take two sorts of actions. First, countries are urged to ensure that their competition laws effectively halt and deter hard core cartel conduct. This requires that sanctions and investigatory powers are adequate and that exclusions and authorizations of what would otherwise be hard core cartels are both necessary and no broader than necessary to achieve their overriding policy objectives. Second, the recommendation urges countries to cooperate with one another in enforcing their laws against cartels. The Recommendation then sets forth several principles and practices that contribute to effective co-operation in

the anti-cartel effort. The Recommendation...also invites non-Member countries to associate themselves with it.” (OECD, 2002b, p.3)

One potential payoff from this initiative is that it may strengthen the deterrent value of national anti-cartel enforcement which, in turn, may be reflected in the fact that international cartels tend to raise prices less in jurisdictions where anti-cartel laws are perceived to be stronger. It is an interesting research question, therefore, as to whether cartels that were prosecuted in the 1990s did in fact discriminate across jurisdictions on the basis of the deterrent value of their anti-cartel laws. Furthermore, after a few more years have passed, it would be interesting to see if any pattern of discrimination by cartel members has changed as a result of national legislative changes which may well, in part, have resulted from consultations and discussions at the OECD.

Identifying the extent to which international cartels influence market outcomes is also important for assessing a number of proposals advanced by members of the World Trade Organisation (WTO). The membership of the WTO, which is much broader than that of the OECD and includes many economies without competition laws, has to decide in September 2003 at its next Ministerial Meeting in Cancun, Mexico, whether and upon what terms negotiations can proceed on incorporating new disciplines on competition policy into WTO agreements. Moreover, the WTO's Working Group on the Interaction between Trade and Competition Policy has held a number of discussions on international cartels and on the merits of adopting multilateral rules on these matters. Advocates of such rules, which include the European Union, point to the benefits of adopting effective anti-cartel laws, not least in helping tackle international price-fixing and the like. Opponents are concerned about the implementation costs of competition laws and wonder whether enforcement actions by OECD nations against their own firms who engage in cartelisation abroad is a preferable alternative to making developing economies adopt their own anti-cartel laws (Hoekman and Mavroidis, 2002). It is, of course, an empirical question as to the extent to which the damage done by international cartels is reduced by the adoption of, or the strengthening of, national anti-cartel enforcement regimes. Furthermore, even if such cartels were highly responsive to changes in anti-cartel enforcement regimes, then one would then want to compare the benefits that accrue from such steps with the associated implementation costs. As noted above, we will present evidence that is pertinent to such a cost benefit analysis for 10 developing economies in Africa and Latin America.

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Table 1: Within a region, did the vitamin conspirators especially target those economies without anti-cartel laws?

Region	Estimated Percentage change in vitamins imports over first five years of cartel's life		Estimated Percentage change in vitamins imports over ten years of cartel's life	
	Economies with a cartel law	Economies without a cartel law	Economies with a cartel law	Economies without a cartel law
Africa	-41.14	18.53	-61.33	9.42
Asia	-1.98	4.08	97.39	6.18
Europe	3.05	188.64	68.20	452.90
Latin America	24.61	34.99	53.73	63.23

Another way of looking at these findings is to consider what would have happened to the same imports of two economies at \$100 of imports in 1990

Region	Economies with a cartel law		Economies without a cartel law	
	1990	1994	1990	1994
Africa	100.00	58.86	100.00	118.53
Asia	100.00	98.02	100.00	104.08
Europe	100.00	103.05	100.00	288.64
Latin America	100.00	124.61	100.00	134.99

Table 2: Costs and benefits of anti-cartel laws: a trade off between more over-charges from cartelised imports and implementation costs

Economy	Reduction in cartelised imports due to anti-cartel law	Reduction in overcharges caused by presence of anti-cartel law		Annual cost of running the nation's competition authority (not just their anti-cartel law) Data refers to latest year available, always 1999 or later.	Reduction in overcharges as a percentage of the annual cost of running the nation's competition authority		Source of data for costs of running competition agency
		Calculated using O'Connor's lowest estimate for price rises due to cartel (35 percent)	Calculated using O'Connor's highest estimate for price rises due to cartel (75 percent)		Calculated using O'Connor's lowest estimate for price rises due to cartel (35 percent)	Calculated using O'Connor's highest estimate for price rises due to cartel (75 percent)	
		Millions of US dollars			Percentage		
Peru	0.19	0.066	0.142	10.05	0.66	1.42	Authority's own web page
Colombia	0.55	0.192	0.411	5.47	3.51	7.52	Authority's own web page
Zambia	0.02	0.007	0.015	0.13	5.42	11.61	CUTS (2002)
Mexico	1.69	0.592	1.268	9.70	6.10	13.07	Hahn and Layne-Farrar (2002)
Venezuela	0.36	0.127	0.273	1.36	9.38	20.09	Authority's own web page
Argentina	0.70	0.244	0.524	1.40	17.45	37.40	Hahn and Layne-Farrar (2002)
Tanzania	0.05	0.018	0.038	0.07	25.61	54.88	CUTS (2002)
Kenya	0.42	0.148	0.316	0.26	56.75	121.61	CUTS (2002)
Brazil	1.91	0.667	1.430	1.15	58.13	124.57	Authority's own web page
South Africa	22.80	7.982	17.104	8.76	91.11	195.25	CUTS (2002)

Appendix Table 1: Countries included in sample

Region and country	Vitamins Cartel (SITC code 5411)	Anti-Cartel Laws (source WTO (2002) and CUTS (2002))
<i>Africa</i>		
Algeria		
Angola		
Benin		
Burkina Faso		
Cameroon		
Chad		
Congo		
Cote D' Ivoire		
Egypt		
Ethiopia		
Gabon		
Ghana		
Guinea		
Kenya		
Madagascar		
Malawi		
Mali		
Mauritius		
Morocco		
Mozambique		
Niger		
Nigeria		
Rwanda		
Senegal		
South Africa		
Tanzania		
Togo		
Tunisia		
Uganda		
Zambia		
Zimbabwe		
<i>North America</i>		
Canada		
USA		
<i>Latin America</i>		
Argentina		
Bolivia		
Brazil		
Chile		
Colombia		
Costa Rica		
Dominican Republic		
Ecuador		
El Salvador		
Guatemala		
Haiti		
Honduras		
Jamaica		
Mexico		
Nicaragua		
Panama		
Paraguay		
Peru		
Trinidad Tobago		
Venezuela		

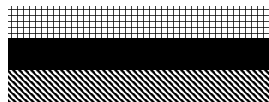
<i>Asia</i>		
Bangladesh		
Cambodia		
China		
Hong Kong		
India		Grid
Indonesia		
Iran		
Israel		
Japan	Diagonal	Grid
Jordan		
Korea Republic		Grid
Laos		
Lebanon		
Malaysia		
Nepal		
Pakistan		Grid
Philippines		
Saudi Arabia		
Singapore		
Syria		
Thailand		Grid
Turkey		Grid
Vietnam		
Yemen		
<i>Europe</i>		
Austria		Grid
Belgium-Lux		Grid
Bulgaria		
Denmark		Grid
Finland		Grid
France		
Germany	Diagonal	Grid
Greece		
Hungary		
Ireland		
Italy		
Norway		
Poland		Grid
Portugal		Grid
Romania		Grid
Spain		Grid
Sweden		Grid
Switzerland	Diagonal	Grid
UK		Grid
<i>Oceania</i>		
Australia		Grid
New Zealand		Grid
Papua New Guinea		

Key

Economy has an anti cartel law

Importer

Exporter



Appendix Table 2: Which specification of the vitamin cartel's effects best fits the data? One that allows for the effects to differ across regions and between nations that do and do not have anti-cartel laws within a region.

Specification		Value of the Akaike Information Criterion with full sample	Value of the Akaike Information Criterion in sample without outliers
Number	Description		
1	Common effects across all markets	1.1591	0.8946
2	Effects differ across nations with and without anti-cartel laws	1.0814	0.8161
3	Effects differ across nations that are rich and poor	1.136	0.8788
4	Effects differ across nations that are rich and poor and that have or do not have anti-cartel laws	1.0644	0.8125
5	Effects differ across regions	1.1087	0.8488
6	Effects differ across regions, as well as varying within a region, across nations that have or do not have anti-cartel laws	1.0166	0.7569
Number of observations in sample		2517	2216


Remark: Lower values of the Akaike Information Criterion indicate that an econometric specification (model) better fits the data.

Appendix Table 3: Parameter estimates of impact on trade flows of the vitamins cartels; with and without outliers.

Independent Variable			Vitamins cartel, 1990-1999	
			Complete sample	Outliers removed from sample
Africa	with anti-cartel laws	Five Years Before Cartel	6.08	6.63
		First five years of cartel	5.69	6.10
		Second five years of cartel	4.68	5.68
	without anti-cartel laws	Five Years Before Cartel	5.73	6.11
		First five years of cartel	5.80	6.28
		Second five years of cartel	5.40	6.20
Latin America	with anti-cartel laws	Five Years Before Cartel	7.65	7.81
		First five years of cartel	7.78	8.03
		Second five years of cartel	8.09	8.24
	without anti-cartel laws	Five Years Before Cartel	5.56	6.04
		First five years of cartel	5.80	6.34
		Second five years of cartel	6.13	6.53
Asia	with anti-cartel laws	Five Years Before Cartel	7.06	7.38
		First five years of cartel	7.11	7.36
		Second five years of cartel	7.76	8.06
	without anti-cartel laws	Five Years Before Cartel	6.30	6.70
		First five years of cartel	6.41	6.74
		Second five years of cartel	6.45	6.76

Europe	with anti-cartel laws	Five Years Before Cartel	6.83	6.98
		First five years of cartel	6.75	7.01
		Second five years of cartel	7.28	7.50
	without anti-cartel laws	Five Years Before Cartel	5.73	5.98
		First five years of cartel	6.77	7.04
		Second five years of cartel	7.51	7.69
Oceania	with anti-cartel laws	Five Years Before Cartel	7.25	7.61
		First five years of cartel	7.65	8.24
		Second five years of cartel	7.96	8.51
	without anti-cartel laws	Five Years Before Cartel	3.43 (0.10)	
		During Cartel		
		After Cartel	5.78	5.90
Total bilateral trade of other products (proxy for non-output related determinants of bilateral trade; should have positive sign.)			0.38	0.29
Total exports of a given supplier of the cartelized product (proxy for total output of the cartelised good produced in a given exporter; should have positive sign.)			0.40	0.34
National income of the exporter (should have negative sign)			-0.31	0.22
Number of dummies used			29	28
Number of observations			2517	2266
R ²			0.39	0.33

Key

1. No data points to estimate this parameter 
2. p-values are less than 0.01 unless otherwise stated in parentheses