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# CPI ANTITRUST CHRONICLE

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## I. INTRODUCTION

Billions of dollars' worth of public contracts are allocated every year through auction-like mechanisms.<sup>3</sup> In theory, with a sufficient number of bidders, auctions represent an efficient way for governments to ensure the provision of goods and services. In practice however, calls for tender often involve only a small number of participants, who may sometimes coordinate their actions to rig the results of the auction and deter the entry of potential competitors. These reductions in competition can result in much higher prices paid by governments.

In this article we summarize findings from our examination of the behavior of participants in procurement auctions in the construction industry in the Canadian province of Quebec that shed light on the impact of bid coordination and entry deterrence.<sup>4</sup> We make use of information uncovered during investigations into allegations of collusion and corruption in the construction industry in Quebec, along with detailed bidding data obtained through access to information requests. The focus is on the municipal procurement of asphalt in Montreal, which was mentioned as a cartelized market during the investigations.

Our analysis leverages the fact that collusion presumably ceased following the investigation. We compare prices and participation levels before and after the investigation in order to learn about the impact of the cartel and about the relative importance of coordination (selection and coordination of profitable collusive pricing strategies and monitoring behavior to prevent defection) and entry deterrence for achieving successful collusion.

## II. THE INVESTIGATION

On October 22, 2009 a police task force known as Opération Marteau was charged with investigating allegations of collusion and corruption in Montreal's construction industry. The launching of the task force followed the broadcast earlier that month of an episode of Canadian news television show *Enquête* detailing allegations of bid rigging, market segmentation, complementary bidding, and bribes to bureaucrats.<sup>5</sup> Later testimony from

<sup>3</sup> According to the OECD, member countries in 2018 spent approximately 12 percent of their GDP in public procurement. This percentage can be higher in developing countries. See: <http://www.oecd.org/gov/public-procurement/>.

<sup>4</sup> This article is based on our academic paper: Clark, R., D. Coviello, J.-F. Gauthier & A. Shneyerov (2018), "Bid rigging and entry deterrence in public procurement: Evidence from an investigation into collusion and corruption in Quebec," *The Journal of Law, Economics, and Organization* 34, 301–363.

<sup>5</sup> **Legal disclaimer:** This article analyses the alleged cartel case strictly from an economic point of view. We base our understanding of the facts mostly on data obtained from the municipal clerk's office through access to information requests, through transcripts of testimony from the Charbonneau Commission, and the testimony presented in the *Enquête* broadcast. The investigation into, and prosecution of, firms involved in the alleged conspiracy is ongoing. The allegations have not been proven in a court of justice. However, for the purpose of this analysis, we take these facts as established.

the *Commission of Inquiry on the Awarding and Management of Public Contracts in the Construction Industry* (commonly referred to as the *Charbonneau Commission*), formed two years later in October 2011 to dig further into the allegations, substantiated the claims of corruption and collusive schemes in various construction-related industries in Montreal and for some provincial contracts.

The collusive arrangement consisted of market segmentation, complementary bidding and payoffs to bureaucrats. Prior to the allocation of contracts by municipalities or the Ministry of Transport, conspiring firms would obtain private information regarding the contracts (location, size, etc.) from municipal or provincial officials.<sup>6</sup> Testimony during the Charbonneau Commission detailed bribes provided to officials.<sup>7</sup> Representatives would then meet to determine which contracts would be assigned to which firms based on the firms' production capacities and plant locations. The agreed-upon winner then organized bidding on that contract (selecting its bid and those of competitors). Prior to the submission closing date, the assigned winner would contact the other participants to provide instructions on complementary bidding.<sup>8</sup> According to statements from dissidents, complementary higher bids were submitted to simulate competition.

Threats and intimidation were employed to deter competition. When preparing submissions, firms had to request plans from municipal officials. According to testimony, should non-cartel firms have requested the plans, municipal informants would immediately contact cartel members.<sup>9</sup> These non-member potential bidders would be informed that the contract did not belong to them, and that they should either follow cartel assignment rules or withdraw their submission. In the event that they refused, the cartel would harass them unceasingly until the opening date of the submission. If the potential bidder still refused to join the cartel or abstain from bidding, individuals would be sent to deliver a threat in person.<sup>10</sup> If the threats did not achieve their desired impact and a non-member participated in the call for tenders and won the contract, project completion was unlikely. According to testimony, the cartel would tamper with equipment and materials, and would exert physical violence.<sup>11</sup>

### III. IMPACT OF THE INVESTIGATION ON PROCUREMENT OUTCOMES

To evaluate the effect that the police investigation, Opération Marteau, had on outcomes we compare prices and participation levels in Montreal after the investigation to prices and participation levels before. Since contracts are negotiated only once a year in the spring, we establish our structural break in 2010, assuming that bidding in Montreal became competitive again from this point. Testimony during the Commission implied that the start of Opération Marteau caused collusion to abate.

This *before & after* approach to studying the impact of the cartel on outcomes has the advantage of simplicity. Unfortunately, other factors may have influenced the evolution over time of these two variables, and so it is useful to *control* for changes in the asphalt market by contrasting the behavior of firms in Montreal to the behavior of firms in a benchmark market, that presumably did not react to the police investigation. In our context, we make use contracts in Quebec City as a competitive benchmark. The choice of Quebec City as a competitive benchmark is justified by the fact that, to our knowledge, its asphalt market was never cited during Opération Marteau or the Charbonneau Commission. According to the allegations in the Enquête broadcast, the initial focus of Opération Marteau was on Montreal. Quebec City is located about 250 kms from Montreal, and while one might ideally select a neighboring city to serve as a benchmark, in this case many markets surrounding Montreal have been cited and therefore would not be reliable controls. Most of the suburbs located on the North and South shores of the island of Montreal were mentioned in the investigation. Furthermore, calls for tenders in the Montreal and Quebec City are similar in many ways: (i) the auctions are held during the same period; (ii) the auctions are designed per borough; (iii) the yearly budget for asphalt for the two cities is usually not too different; and (iv) prior to the investigation, bidding patterns were similar in the two markets. Altogether these facts imply that Quebec City represents a suitable control, and therefore, to estimate the effect of the investigation on bidding behavior, we use a *difference-in-difference* approach comparing the difference in contract outcomes in Montreal before and after the investigation to the difference in outcomes in Quebec

6 See paragraphs 684-686 and 724 of Jean Théoret's Testimony from the Charbonneau Commission, November 26, 2012.

7 These included invitations to fishing and yachting trips, wine and hockey tickets, and also political donations. See paragraphs 1226, and 185 to 206 of Gilles Théberge's testimonies from the Charbonneau Commission, May 23-24, 2013.

8 See paragraphs 997-1009 and 1060-1100 of Gilles Théberge's testimony from the Charbonneau Commission, May 23, 2013.

9 See paragraphs 684-686 and 724 of Jean Théoret's Testimony from the Charbonneau Commission, November 26, 2012.

10 For an example of this behavior, see paragraphs 1102 to 1133 of Piero Di Iorio's testimony at the Charbonneau Commission, November 26, 2012.

11 See paragraphs 839-915 from Jean Théoret's testimony at the Charbonneau Commission, November 26, 2012.

We collected detailed data for the municipal procurement of asphalt through *Access to Information* requests at the Municipal Clerk's offices for the period 2007 to 2013. The data provide information on all public tenders, and the participating bidders before and after the investigation started. Contracts are at the borough level. In Montreal, calls are for different asphalt types, whereas for Quebec City calls aggregate over asphalt types. As a result, there are many fewer calls in Quebec City each year (one per borough) than in Montreal (up to eleven per borough). We have information on all submitted bids (raw bids and transportation charges), and the identity of the winner.

Table I describes the contracts awarded over the sample period in Montreal and Quebec City respectively. We can also see that, prior to the investigation, raw bids in Montreal were \$75 per ton, but only \$57 in Quebec City. In the post-announcement sample the differences between Montreal and Quebec were considerably smaller. Note that this is due to changes both in Quebec City and in Montreal following the announcement. Prices increased by \$6 in Quebec City and fell by over \$8 in Montreal. Therefore, the difference-in-difference effect is \$14 (=-\$8-\$6), suggesting the investigation had a large economic impact on bidding behavior in Montreal's asphalt market.

Table I: Descriptive statistics for Montreal and Quebec City

Year	\$ awarded (millions)	Nbr contracts	Nbr bidding boroughs	Avg tons of asphalt	Nbr bidding firms	Nbr bids per contract	Avg winning bid (\$/ton)
<b>Montreal</b>							
	Total		Average				
2007 - 2009	8.1	215	12	491	5.3	2.6	75
2010 - 2013	11	401	17	650	7.8	3.6	67
<b>Quebec City</b>							
	Total		Average				
2007 - 2009	5.9	22	7.3	3,818	6.3	3.7	57
2010 - 2013	10	24	6	5,399	4.8	3.3	63

Figure 1 plots the evolution of raw bids over time in Montreal and Quebec City. Prices were higher in Montreal than in Quebec City prior to the investigation, but the trends in the two cities were common with bids roughly following the price of the main input in the production of asphalt, which we proxy with the price of crude oil (with a lag), until the start of the investigation, at which point prices in Montreal diverged to fall in line with prices in Quebec City.

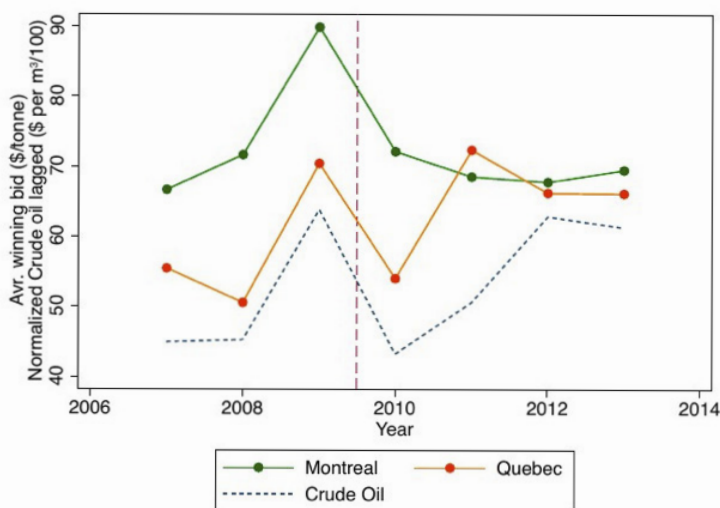


Figure 1: Winning bids before-after the investigation

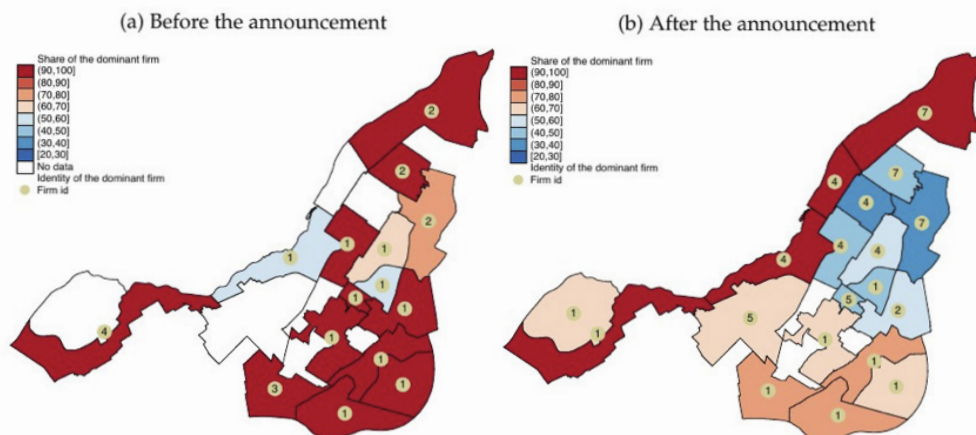
<sup>12</sup> This approach has been used to study the impact of alleged price fixing in other markets (see for instance Clark, R. & J.-F. Houde (2014), "The effect of explicit communication on pricing: Evidence from the collapse of a gasoline cartel," *Journal of Industrial Economics* 62, 191–228.).

Next, we turn to the effect of the investigation on entry and participation. Prior to the investigation, a total of six firms bid for contracts for the supply of asphalt in Montreal. Three other firms entered subsequently. Two of these placed bids for the first time in 2010, while the other began bidding in 2012. These three entrants had been active in the private sector prior to 2010. Despite the fact that they each had the capacity to supply public contracts, they never placed bids in municipal auctions prior to this date. In Quebec City, no firms enter, and one firm no longer participates in any calls for tender. There were a total of seven firms that bid on tenders for the supply of asphalt in Quebec City in the 2007-2013 period. Two of the firms won large fractions of the contracts in both time periods. As mentioned above, the number of participants per auction actually fell from before the investigation to after.

Looking again at Table 1 we can see that there was a large increase in the number of bids per contract in Montreal post investigation. In the pre-investigation period there were 2.6 bids per contract vs 3.6 afterwards. In contrast, the number of bids fell slightly in Quebec City from 3.7 in the pre-period to 3.3 in the post.<sup>13</sup> Together, these numbers imply that collusion caused the number of bidders per auction to fall by about 1.4 (that is to say, the difference-in-difference estimate is  $1.4 = 1 - (-0.4)$ ).

During the pre-investigation period one incumbent firm had a revenue share greater than half, and three firms dominated the market. After the investigation the market share of two of these firms fell dramatically, but increased for the smallest of the three. Two of the three entrants pick up a little under a third of the market. Figure 2 presents the share of the dominant firm (as measured by total amounts of contracts won) in each borough of Montreal before and after the investigation. The incumbent firms win a smaller share of contracts after the investigation, and in some cases are no longer the dominant firm in the borough afterwards.

Figure 2: Dominance of firms and market-share in Montreal



## IV. CARTEL ORGANIZATION: COORDINATION VS ENTRY DETERRENCE

Our analysis thus far reveals that, after the investigation, raw bids decreased in Montreal relative to Quebec City, and that three new players entered the Montreal market, leading to a significant increase in the number of participants per auction. We next investigate the role that entry played in explaining the documented price change in order to learn about cartel organization. Successful collusion requires cartel members to overcome two principal organizational challenges: (i) coordinating an agreement amongst themselves and (ii) deterring the entry of potential competitors.

<sup>13</sup> The average number of tonnes per contract increases significantly in 2013, but this can largely be explained by one contract. In 2013, the district of Ville-Marie ordered 20 000 tonnes in a single contract. The average without this contract is 736.38 tonnes per contract. Overall, we observe that in 2010 and 2011 districts ordered smaller quantities of all asphalt types while in 2012 and 2013, they switched to fewer asphalt types but ordered in greater quantities.

To quantify the relative importance of these two activities we re-estimate the same difference-in-difference effect as above, but this time restricting our attention to auctions in which there was no entrant present (in Montreal). Although entrants began participating in calls for tender following the investigation it is possible to find a set of auctions in which they did not take part, and to redo our price analysis for this subset of auctions. Our results imply that, even in auctions without entrants, the difference-in-difference estimate is around \$12. In other words, even limiting attention to auctions in which there was no entrant present, prices are still found to have fallen significantly in Montreal after the investigation. These findings suggest that the price decrease is mostly due to changes in bidding behavior by incumbent firms, which appears to be more competitive following the investigation.<sup>14</sup>

## V. POLICY IMPLICATIONS

Our findings provide insight into the organization of bidding rings in public procurement. While entry deterrence is an element of the cartel mechanism, it is less important than the ability of cartel members to coordinate bids. These results can provide direction to policy makers on how to allocate limited resources when combating collusion and corruption. Emphasis has been on the need to encourage the participation of a large number of bidders in the procurement process by eliminating policies that place restrictions on entry or participation.<sup>15</sup> Our findings imply that more resources should be devoted to eliminating communication and coordination and fewer to designing tender processes that elicit maximum participation.

We have documented that following the investigation prices fell and entry and participation increased. Our results imply that coordinating a profitable and stable agreement was the main function of this particular cartel. The relatively small role of entry deterrence may be at least in part due to the fact that there are six firms in the industry already and so, absent collusion, a fairly competitive outcome can be achieved. However, in other contexts even larger numbers of firms did not guarantee a competitive outcome. For instance, when Austria joined the European Union and Europe-wide competitors were allowed to bid in their treasury auction the number of participants moved from 15 to 25 and bond yields fell.<sup>16</sup>

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<sup>14</sup> The problem with this approach is that auctions in which entrants participated may be different from those in which they did not and so controlling for entry in our regression analysis might introduce a bias. Moreover, this specification does not allow us to control for the threat of entry, but only the presence of an actual entrant in an auction. To address these issues, and confirm our reduced-form findings in Clark et al. (2018) we follow a quantitative model-based approach.

<sup>15</sup> For example, contracts should be well defined in terms of products and delivery times to encourage firms with excess capacity to bid (see for instance Coate, M. B. (1985), "Techniques for protecting against collusion in sealed bid markets," *The Antitrust Bulletin* 30, 897–914), or call for tenders could be advertised on newspapers or the world-wide-web, (see for instance Coviello, D. & M. Mariniello (2014), "Publicity requirements in public procurement," *Journal of Public Economics* 109, 76–100).

<sup>16</sup> See Elsinger, H., P. Schmidt-Dengler & C. Zulehner (2019), "Competition in Austrian treasury auctions," *American Economic Journal: Microeconomics* 11, 157–184.

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