The Value of Central Clearing

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Motivation

- **Financial frictions impede trading** $\rightarrow$ Inefficient allocations
  - But agent design contracts to undo frictions (Allen & Gale, 1988)
  - In history: bill of exchange, insurance, intermediaries, limited liability
  - Causal impact on real outcomes is hard to identify

- This paper: **First appearance of a contracting innovation**
  - First central clearing counterparty (CCP) in history
  - CCPs: netting of transactions + insulation against counterparty risk
  - CCPs now widespread and mandatory worldwide post 2008-9

This paper

- Contractual innovation: **Central clearing of derivatives**
  - Introduced in Le Havre (France) in 1882 for coffee futures
  - Functioning extremely similar to modern CCPs
  - Key innovation: Insulation from counterparty risk, not netting
- Results I: **Significant effects of central clearing on trade flows**
  - More coffee imports, exports and stocks in Le Havre
  - ... relative to uncleared commodities and to other harbors
  - ... within France and across European countries
- Results II: **Two mechanisms at play**
  - Solve a "missing market" problem $\rightarrow$ For established traders
  - Reduce adverse selection $\rightarrow$ For new traders
  - Mechanisms unrelated to clearing are ruled out

Theory and hypothesis

- **H1**: Central clearing increases trade flows in underlying goods
- Underlying theory: **Trading requires dealers to hold inventories**
  - Limited risk-bearing capacity of dealers impairs trading
  - Better ability to hedge inventories increases trade
- **Why does central clearing improve hedging ability?**
  - Mechanism 1: Markets become more complete
  - Mechanism 2: Lower adverse selection about counterparty risk

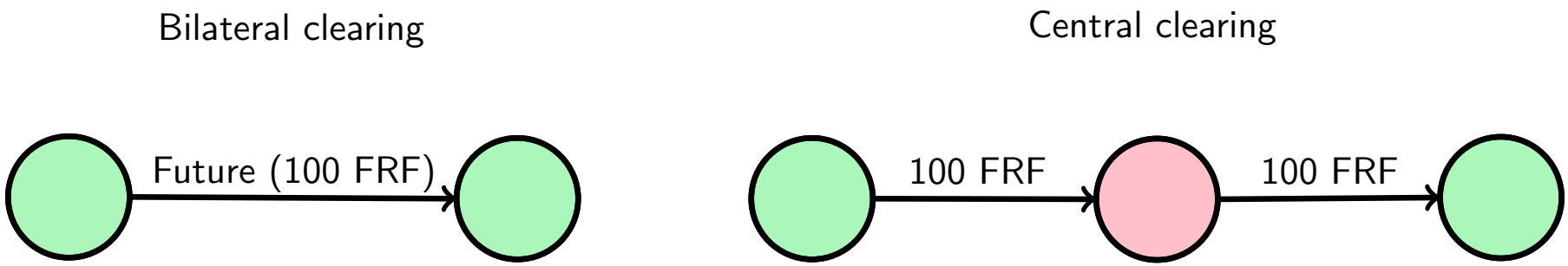
Historical background

- **"Northern range": Most active trade area worldwide in 1880s**
  - London, Liverpool, Le Havre, Antwerp, Rotterdam, Hamburg, etc.
  - Free-trade policies + technological progress (steamboats)

- **Long-distance trade creates price risk**
  - Coffee exported after production (Brazil) and warehoused by dealers
  - Large inventories until coffee sold for consumption
  - Wide use of bilaterally traded forward/future contracts

- **Coffee crisis in 1880** $\rightarrow$ Caisse de liquidation (*CLAM*)
  - Large decline in coffee prices $\rightarrow$ Failures and trade breakdown in US
  - Trade slows down in Europe $\rightarrow$ Reputation no longer sufficient
  - Coffee traders study institutions to stabilize trade

The functioning of the CLAM



- **After novation, CLAM bears all counterparty risk**
  - Membership: Counterparties must be brokers domiciled in Le Havre
  - Initial margins + daily variation margins
  - If failure on margin calls: Liquidate positions
  - If loss: Equity is impaired

- **CLAM starts operating on December 16th, 1882**
  - Fully private initiative (limited liability corporation)
  - Equity holders are commodity traders/dealers
  - Key innovation: Counterparty risk management

Data and archive sources

- **Institutional data**: Various archive centers
  - General assembly minutes, rulebooks, policy discussions [See]
- **Futures market data**: Daily *Bulletin de correspondance*
  - Future prices, trading volume and identity of traders [See]
- **Trade data**: Customs' archive for each country [See]
  - France: Bilateral trade flows by commodity at harbor level
  - Europe: Bilateral trade flows by commodity and country pairs
  - Coverage: Belgium, France, Germany, Hamburg, Italy, Netherlands, Norway, Sweden
- **Consumption data**: Graham (US Department of Agriculture, 1912)

Trade flows - Identification strategy

- H1: Central clearing increases trade flows in underlying goods
- **Triple diff-in-diff with CLAM creation as experiment**

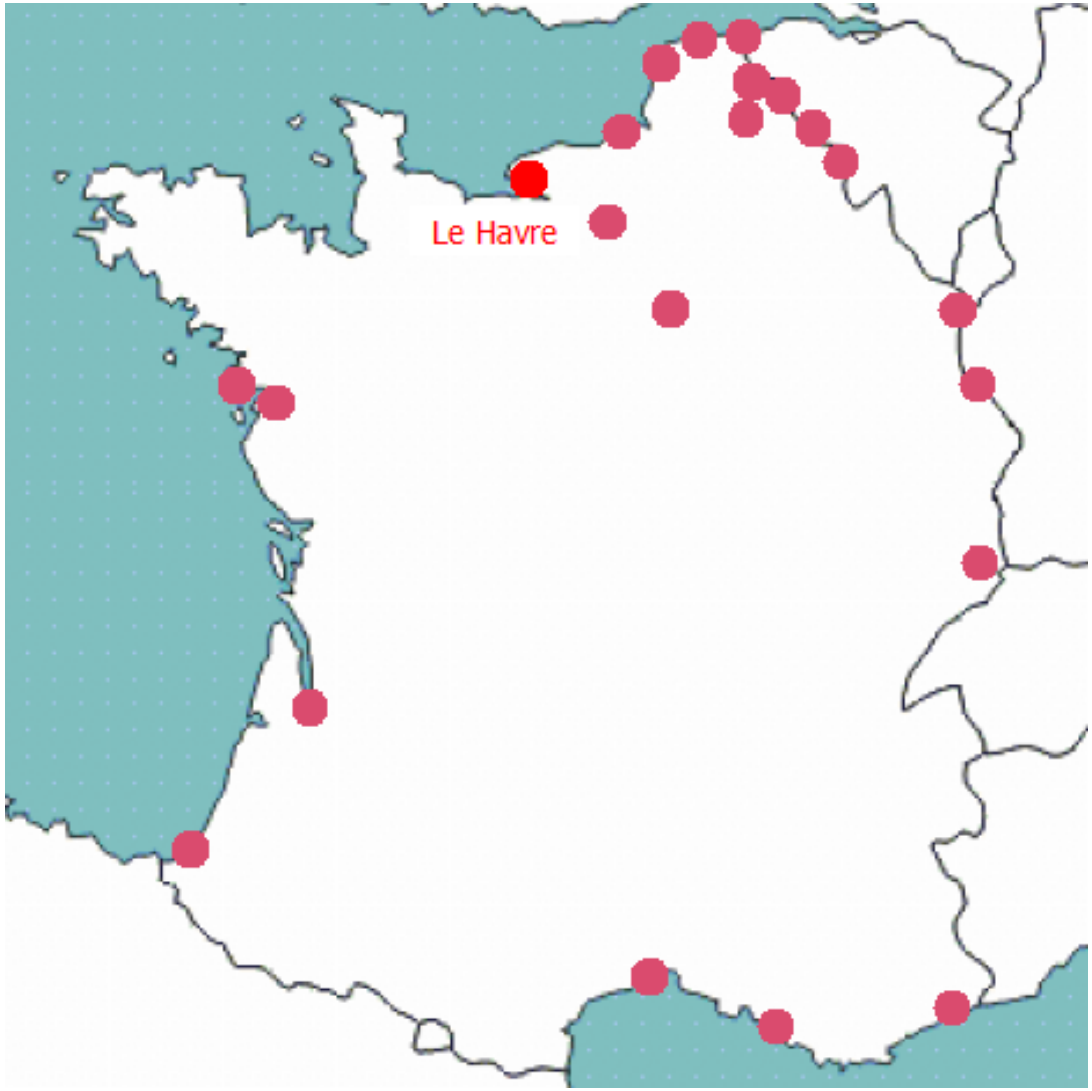
$$\begin{aligned} Share_{cht} &= \alpha + \beta_1 \cdot CCP_{ht} + \beta_2 \cdot Cleared_c \cdot Post_t \\ &\quad + \beta_3 \cdot CCP_{ht} \cdot Cleared_c + \mu_t + \mu_{ch} + \epsilon_{cht} \end{aligned}$$

  - $Share_{cht}$: Imports, exports, stocks of commodity c in harbor h at t
  - CCP_{ht}: Equals 1 if CCP in place in harbor h at t
  - $Cleared_c$: Equals 1 for commodities eventually cleared
  - $Post_t$: Equals 1 strictly after 1882
- **Control group**: "Colonial commodities"
  - Sugar, cocoa, pepper, tea, vanilla, tobacco
  - Not produced in continental Europe $\rightarrow$ Pure trade effect
- **Sample period**: 1877-1887

Trade flows - Exogeneity of treatment

- **Exogeneity 1**: Price dynamics similar across markets (telegraph)
- **Exogeneity 2**: No evidence of more severe 1880 crisis in Le Havre
  - Based on *Bulletin de correspondance* and local newspapers
- **Exogeneity 3**: Clearing was a debated innovation
  - Depitre (1907): "*At the beginning, opinions were strongly divided in the commercial circles in Le Havre. A number of important trading houses refused to participate in the CLAM and a number of them avoided any relationship with it.*"
  - Clearing also debated abroad for years
  - Unlikely traders could foresee what effects would be
- **Exogeneity of treated commodity**: Coffee
  - Clearing also introduced in cotton $\rightarrow$ Consistent results

Trade flows - Sample of 22 French harbors



Trade flows - Within-France estimates

- **Significant increase in coffee trade activity in Le Havre**
  - ... relative to control commodities
  - Large economic magnitude: Explained by market structure

	Dependent variable:				
	Share of imports	Share of imports	Share of imports	Share of exports	Share of stocks
$CCP_{ht} \cdot Cleared_c$	0.111***	0.092***	0.177***	0.247***	0.158***
	(0.020)	(0.019)	(0.008)	(0.018)	(0.037)
$Cleared_c \cdot Post_t$	-0.004	-0.004	-0.007***	-0.010***	-0.014
	(0.004)	(0.004)	(0.001)	(0.003)	(0.011)
CCP_{ht}	0.049***	0.069***	-0.016***	0.013	0.029*
	(0.008)	(0.008)	(0.005)	(0.012)	(0.015)
Control group	Colonial	Colonial	Total	Total	Colonial
Incl. sugar	Yes	No	-	-	Yes
R^2	0.944	0.953	0.991	0.964	0.878
N. Obs.	1,656	1,380	552	552	772

Trade flows - Within-France estimates

- **Central clearing for other commodities**
  - Cotton (1882) $\rightarrow$ Exogenous treatment
  - Indigo (1887)

	Dependent variable: Share of imports		
	Cotton (raw)	Cotton (raw and textiles)	Indigo
$CCP_{ht} \cdot Cleared_c$	0.142***	0.072***	0.046***
	(0.020)	(0.015)	(0.010)
$Cleared_c \cdot Post_t$	-0.006	-0.003	-0.002
	(0.004)	(0.003)	(0.002)
CCP_{ht}	-0.171***	-0.036***	0.000
	(0.014)	(0.009)	(0.007)
Control group	Raw	Raw and textiles	Total
R^2	0.966	0.932	0.984
N. Obs.	552	1,380	414

Trade flows - Europe-level estimation

- **Triple diff-in-diff for each country** i

$$\begin{aligned} Share^{i}_{cpt} &= \alpha + \beta_1 \cdot CCP_{pt} + \beta_2 \cdot Cleared_c \cdot Post_t \\ &\quad + \beta_3 \cdot CCP_{pt} \cdot Cleared_c + \mu_t + \mu_{cp} + \epsilon^{i}_{cpt} \end{aligned}$$

  - CCP_{pt}: Equals 1 for France after 1882
  - Counterparties p and control commodities vary based on availability

- **Sample**: 7 countries i
  - UK imports from continental Europe not reported
  - Germany and Hamburg reported separately (*Zollverein*)
  - Exclude countries with no commodity-level flows

Trade flows - Country-level regressions

- **Diff-in-diff within imports coming from France**
  - $\rightarrow$ Significant increase for coffee relative to controls
  - Economic magnitude: France's trade share roughly doubles

	Dependent variable: Share of imports from country p						
	Belgium	Germany	Hamburg	Italy	Nether.	Norway	Sweden
$CCP_{pt} \cdot Cleared_c$	0.062**	0.073*	0.029*	0.030	0.058**	0.047**	0.041*
	(0.030)	(0.044)	(0.017)	(0.027)	(0.029)	(0.023)	(0.024)
$Cleared_c \cdot Post_t$	-0.002	-0.004	-0.000	-0.001	-0.003	-0.001	-0.001
	(0.003)	(0.011)	(0.002)	(0.004)	(0.007)	(0.004)	(0.005)
CCP_{pt}	-0.005	-0.008	0.014**	-0.094***	-0.000	-0.051***	-0.019**
	(0.009)	(0.019)	(0.006)	(0.008)	(0.012)	(0.009)	(0.008)
Control group	Colonial	Colonial	Colonial	Colonial	Colonial	Colonial	Colonial
R^2	0.854	0.808	0.931	0.828	0.884	0.910	0.899
N. Obs.	1,648	864	3,735	4,080	1,368	1,728	2,484

Narrative evidence: Spread of contractual innovation

- **Narrative evidence of large effect is widespread**
  - "*It is not disputable that the creation of the CLAM significantly contributed to maintain the preponderance and to foster the commercial development of the harbor of Le Havre.*" (Depitre 1907)
  - Also in foreign countries (e.g., Hamburg Chamber of Commerce)

- **Other harbors/markets introduced CCPs by mid-1890s**
  - Paris (1885, 1887), Antwerp (1887), Hamburg (1887), Amsterdam (1888), Marseille (1888), Magdeburg (1889), Reims (1890), Leipzig (1890), Roubaix-Tourcoing (1892)
  - Adoption often explicitly motivated by the success of Le Havre
  - Not all of these CCPs succeeded

Channel - Preliminary evidence

- **Increase in completeness?** Four necessary conditions

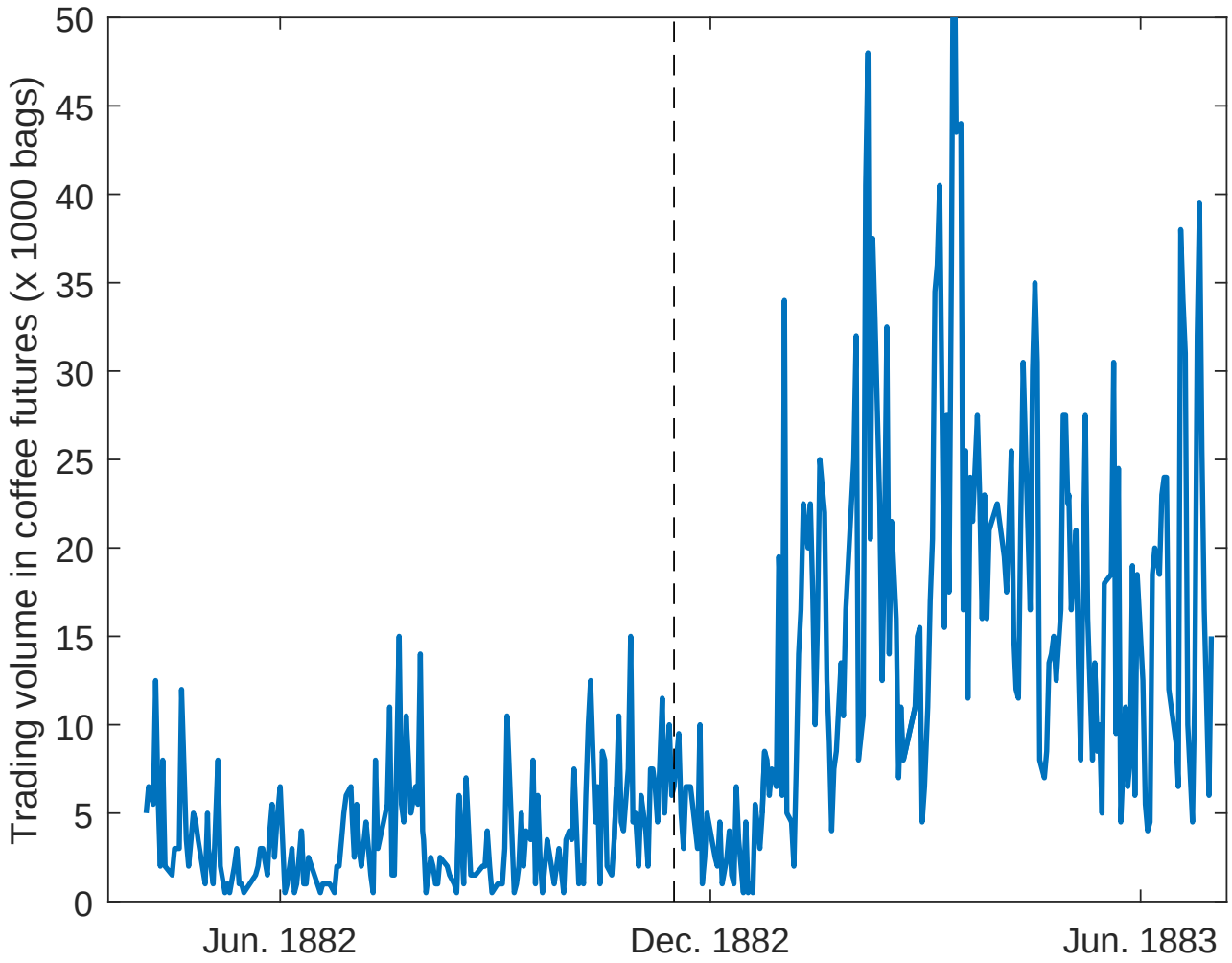
- **I. Counterparty risk impairs trade before CCP**
  - 1880 crisis: drop in number of traders
  - Sayous (1898): "as the future looked highly uncertain, one needed [...] to find a way to reduce the risks for capitalists."

- **II. CCP credibly reduces counterparty risk**
  - High margins, high equity, chairman with strong reputation

- **III. Investors use the CCP**
  - No requirement, but almost all trades cleared [See]

- **IV. Trading activity in futures increases**
  - Collect data on daily trading volume in futures

Channel - Preliminary evidence



- **Trading volume increases significantly**

Channel - Deeper into the mechanism

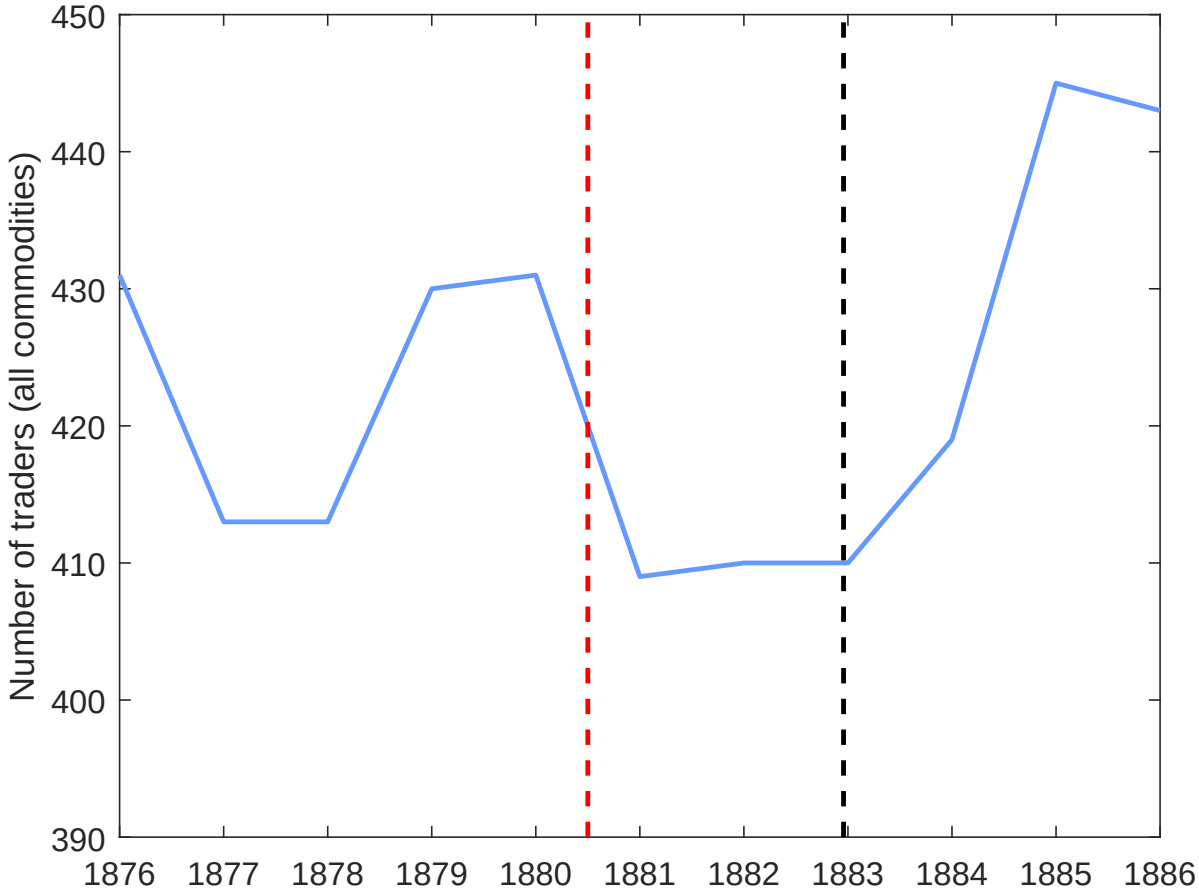
- **Mechanism**: "Missing market" or adverse selection channels?
- Tests: **Predictions about composition of pool of traders**
  - No data on futures transactions
  - But trader-level data on physical transactions (*Bulletin*)
  - Assumption: Better access to futures helps physical trade
  - Yearly register of traders (*Almanach*): Know entry and exit dates
- First test: **Share of low quality traders**
  - Defined as traders exiting within 2 years
  - Idea: If adverse selection large, their share drops after CCP
- Second test: **Share of new traders**
  - Defined as traders entering in preceding 2 years
  - Idea: If adverse selection large, their share increases after CCP

Channel - Deeper into the mechanism

	Dependent variable:	
	Share of trades by members near distress	Share of trades by recent members
$Post_t$	-0.004	0.099***
	(0.014)	(0.014)
$Constant$	0.082***	0.048***
	(0.010)	(0.010)
R^2	-0.002	0.074
N. Obs.	577	577

- **Traders near distress**: Low before CCP (8.2%), does not increase
  - Inconsistent with large adverse selection
  - Long-established traders $\rightarrow$ Quality revealed?
- **New traders**: Share increases
  - Consistent with large adverse selection
  - CCP reduces informational barriers to entry

Channel - Deeper into the mechanism



- **Number of traders continued to increase subsequently**
  - Incumbents established CCP but lost market share
  - Suggests "missing market" problem was large

Channel - Other mechanisms

- Concern 1: **Futures market' liquidity improves**

- Concern 2: **Price transparency improves**

Cafés.— Les Haiti continuent à être très recherchés et se paient de plus en plus cher ; il faut voir une nouvelle hausso à peu près générale de 50 c. et même parfois de 1 fr. pour le livrable ; on a dû payer ainsi 46 à 46 fr. 50 pour Jacmel à livrer, et on parle de Port-au-Prince, aussi à livrer, dans les 41 fr., mais on ne cote pas ces affaires.

En disponible, il s'est encore traité de fortes parties de Jacmel et Port-au-Prince vieux. Les Santos nouveaux se paient aussi de bous prix, et on note près de 2,500 s. à 47 fr. pour fine average.

A terme, il s'est encore traité passablement d'affaires hier soir, aux pleins prix établis,soit à 43 fr. 50 pour janv.-fév.,à 43 fr.50 pour mars, et à 44 fr.50 pour mai.

Ce matin, malgré les dépêches en nouvelle hausse de N.-York, on est plutôt plus facile, et on a pu faire du mai à 44 fr. 25, mais on reste acheteurs ainsi, et on a depuis fait de l'avril au même prix; en clôture, ce dernier mois a de nouveau pu être obtenu à 44 fr., et on a fait du juin à 44 fr. 50.

Cours du terme affichés par la Caisse de Liquidation.

CAFÉ	Précédente	AUJOURD'HUI à 11 h. 1/2	AUJOURD'HUI à 4 h. 1/2
Décembre	42 50	— —	42 50
Janvier	43 50	— —	42 75
Février	43 50	— —	43 —
Mars	43 75	— —	43 25
Avril	44 —	— —	43 50
Mai	44 50	— —	43 75
Juin	44 50	— —	44 —
Juillet	— —	— —	— —
Août	— —	— —	— —
Septembre	— —	— —	— —
Octobre	— —	— —	— —
Novembre	— —	— —	— —

- Before clearing: "*One may have paid 46 to 46.50 fr. for Jacmel to deliver, and one talks about Port-au-Prince, also to deliver, around 41 fr., but there are no quotations for this.*"
- Boost trade for agents fearing adverse selection / market power?

Channel - Other mechanisms

- **Traders valuing liquidity or price transparency could free-ride**
  - No requirement to use CCP and pay associated cost
  - Yet, most transactions were cleared
  - CLAM was profitable from first year
- **Effect localized in Le Havre**
  - Outside traders benefited from liquidity and price transparency
  - But access to clearing was more difficult
  - Due to requirements and margins posting
- $\rightarrow$ **Mechanism is linked to central clearing**

Conclusion

- **Central clearing re-shaped trade flows Europe-wide**
  - Significantly more trade flows in and out of Le Havre
  - Channels: Complete markets + reduce adverse selection
  - By end-1880s, many European harbors had CCPs
- **Implications for current debates on clearing?**
  - Clearing at the CLAM was voluntary $\rightarrow$ How about forced clearing?
  - CLAM was member-owned $\rightarrow$ Distortions in for-profit CCPs?
  - Theories of central clearing remain underdeveloped