Smart Settlement

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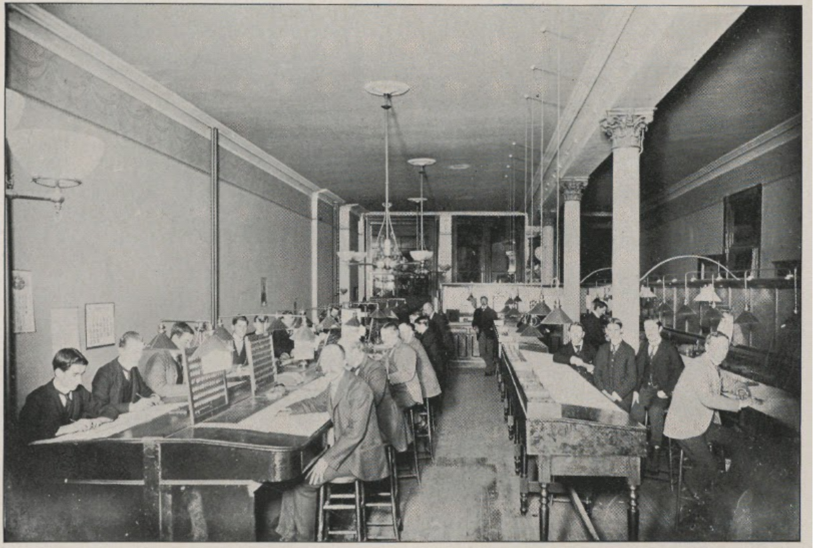
Why the discrepancy?

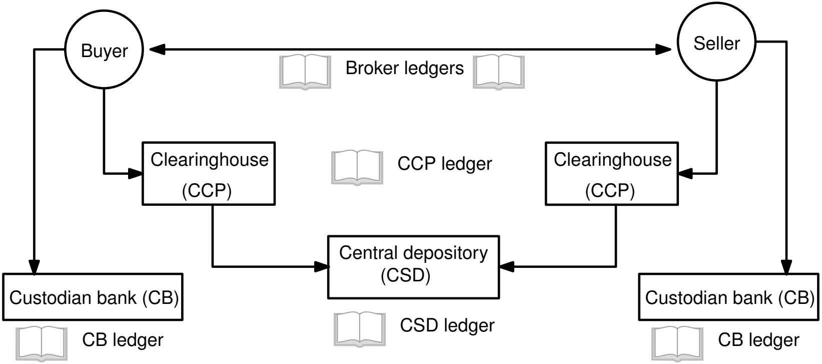
- Institutional rigidity in trade settlement (many fixed steps).
- Distributed ledgers: common platform for post-trade processes.



THE CLEARING HOUSE OF THE NEW YORK STOCK EXCHANGE

No. 45 NEW STREET ROBERT P. DOREMUS, CHAIRMAN OF THE CLEARING HOUSE COMMITTEE WILLIAM V. CAROLIN, MANAGER

Settlement now



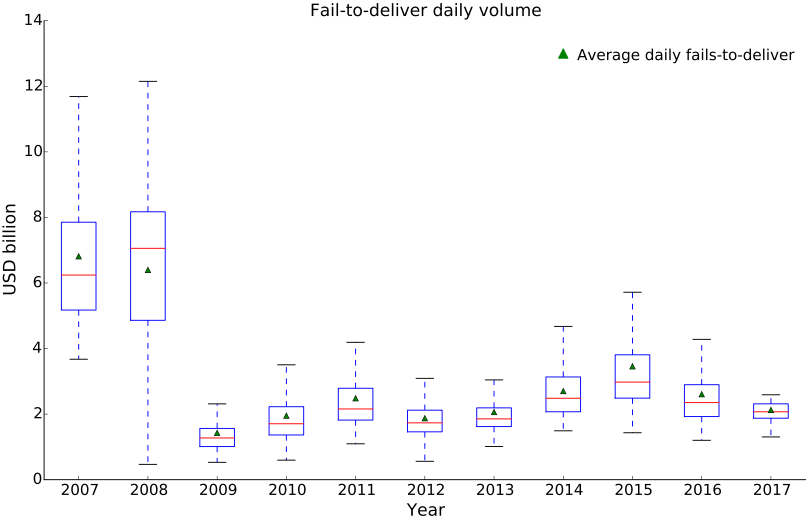
Blockchain 101

Blockchain (or distributed ledgers in general) is the technology behind cryptocurrencies such as Bitcoin:

1. a distributed messaging protocol (ledger);
2. cryptographically encrypted;
3. all transactions into shared, immutable record;
4. creates consensus across traders;
5. no need for reconciliation across multiple institutions.

Blockchain allows for a shorter settlement chain.

Do we want shorter settlement?



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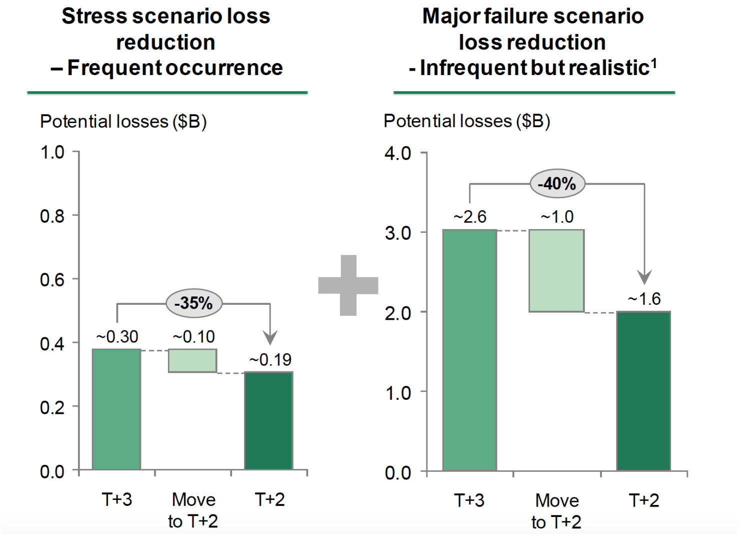

Source: BCG report prepared for DTCC

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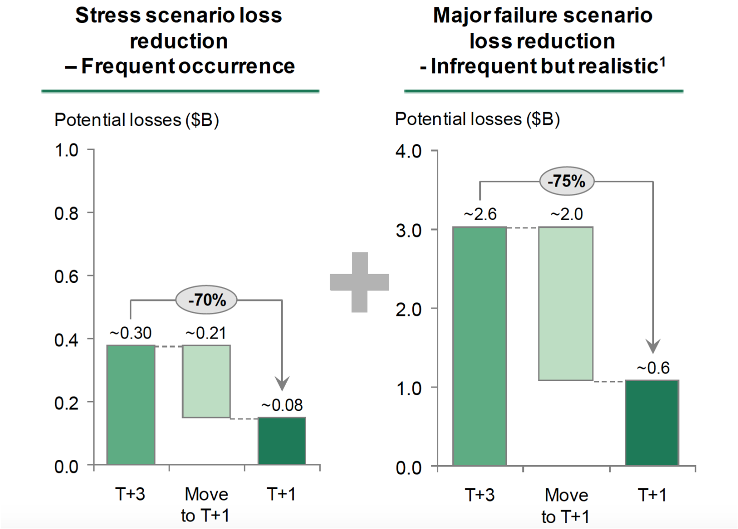

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Do we want immediate settlement?

EDITION: EU

ZDNet

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Sydney Stock Exchange to implement 'instant' blockchain-based settlements

The Sydney Stock Exchange has teamed up with Sydney blockchain startup Bit Trade Labs to drive a project to reduce settlement times from four days to none.

By Asha McLean | September 15, 2016 -- 05:17 GMT (06:17 BST) | Topic: E-Commerce

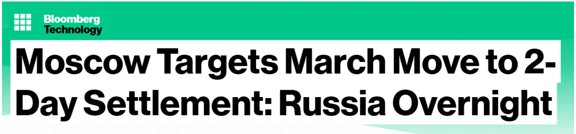
BloombergMarkets

Brokers can complete trades faster if they want. Two days is just the maximum. For instance, TZero, a business majority owned by a Overstock.com Inc. subsidiary, runs a blockchain-based securities platform that offers same-day settlement.

Do we want immediate settlement?

Maybe not:

Immediate trade-settlement was implemented in Russia and then reversed in 2013.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Moscow Targets March Move to 2-Day Settlement: Russia Overnight

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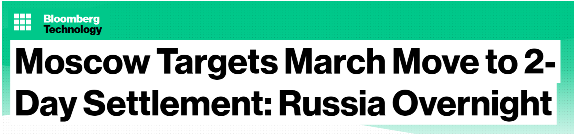
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> *Clients will no longer have to pay their brokers to borrow stock and finance settlement to make their stock sales.*
>
> – Luis Saenz, head of equity sales at BCS Financial Group.

Industry positions

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> *With this technology, you could do T-when you would like it...*
>
> – Chris Church, CBDO, Digital Asset.

Industry embracing the disruption

Blockchain   + Add to myFT

ASX chooses blockchain for equities clearing

Australian bourse becomes first big exchange to commit to the technology

Jamie Smyth in Sydney   8

DECEMBER 7, 2017

Blockchain settlement in the energy industry

BLOCKCHAIN NEWS JUNE 07, 2017 14:23

European Energy Giants Successfully Pilot Blockchain Energy Trading

A trio of major energy firms – oil giants BP and Eni along & Wien Energie, Austria's largest energy company, have completed an energy trading pilot over a blockchain developed by Canadian firm BTL.

The 'intense 12-week pilot, as described by BTL, involved testing an energy trading confirmation solution over BTL's Interbit blockchain platform. As CCN reported during its launch in January 2016, the Interbit platform is a multi-chain ledger that facilitates transfers of funds and assets for remittance and data sharing.

Blockchain settlement in the energy industry

BUSINESS NEWS MAY 24, 2017 / 3:45 PM / 9 MONTHS AGO

TMX says its natgas exchange to test blockchain

Alastair Sharp 3 MIN READ

TORONTO (Reuters) - Canada's biggest stock exchange operator, TMX Group Ltd, said on Wednesday it plans to expand its use of blockchain technology, pitching a service for buyers and sellers of natural gas that should help speed up and simplify transactions.

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- In May 2017 **TMX Group** launched a blockchain-based prototype custom built by Nuco Inc. for NGX natural gas exchange.

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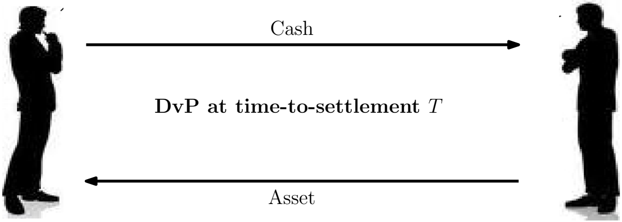
A market with three frictions:

1. counterparty risk;
2. search costs;
3. imperfect competition.

Literature

1. **Blockchain in finance:** Harvey (2016), Lee (2016), Malinova and Park (2016), Biais, Bisière, Bouvard, and Casamatta (2017), Cong and He (2017), Yermack (2017).
2. **OTC search frictions:** Duffie, Gârleanu, and Pedersen (2005), Vayanos and Wang (2007), Lagos and Rocheteau (2009), Cujean and Praz (2015).
3. **Vertical differentation in financial markets:** Shaked and Sutton (1982, 1983), Li and Schürhoff (2015), Neklyudov and Sambalaibat (2015), Pagnotta and Philippon (2015).
4. **Counterparty risk:** Duffie and Zhu (2011), Loon and Zhong (2014), Menkveld (2016).

Model



Buy-side
Heterogenous buyers
with private values θ_i

Sell-side
Can default with probability δT
Finds asset with probability λT

Model primitives

Asset

- One risk-less asset, common value v.

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  Sellers have private value $-v$.

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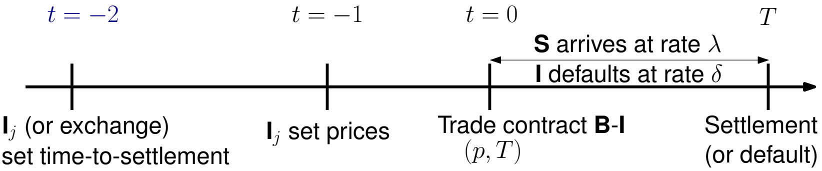

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Trade surplus from contract (p, T) is

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$$\begin{aligned}\text{TradeSurplus}_i =& U_{\mathbf{B}_i} + U_{\mathbf{I}} \\ =& (1-\delta T)\,\theta_i v - p \\ & + p - (1-\delta T)(1-\lambda T)\, v \\ =& \underbrace{(1-\delta T)}_{\substack{\text{Settlement} \\ \text{probability}}} \quad \underbrace{[\theta_i - (1-\lambda T)]\, v}_{\text{Conditional gains from trade}}.\end{aligned}$$

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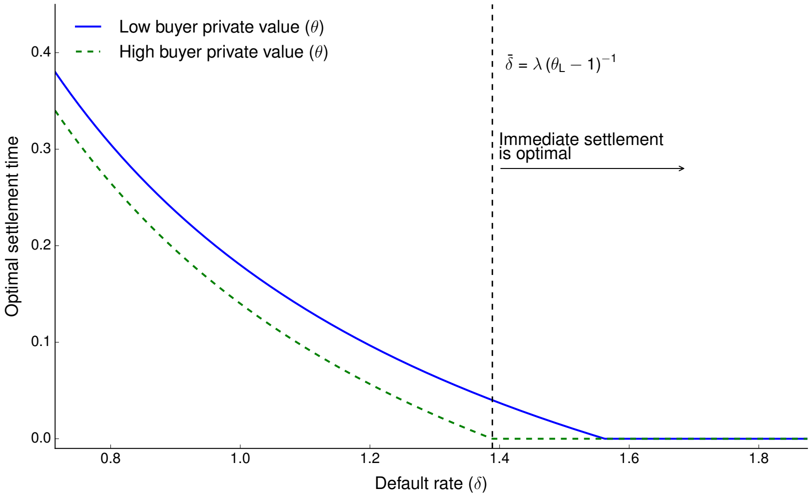
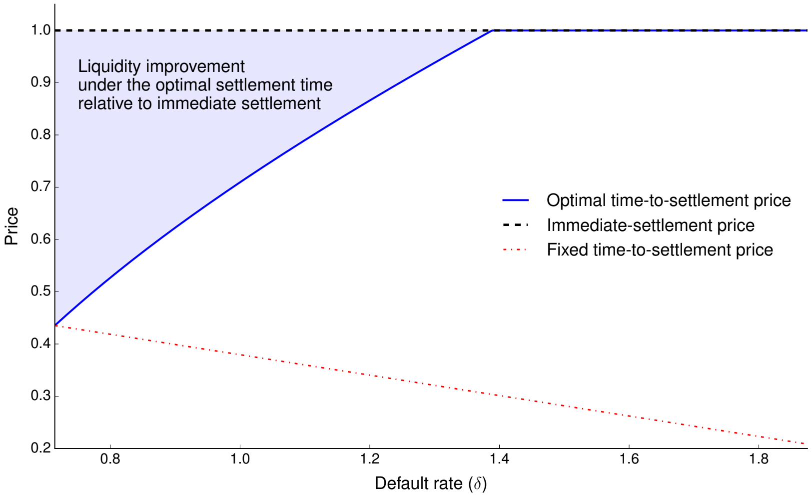
$$T_i^\star = \max\left\{0, \frac{\lambda - \delta(\theta_i - 1)}{2\delta\lambda}\right\}.$$

Immediate settlement is not always optimal



Immediate settlement can reduce liquidity



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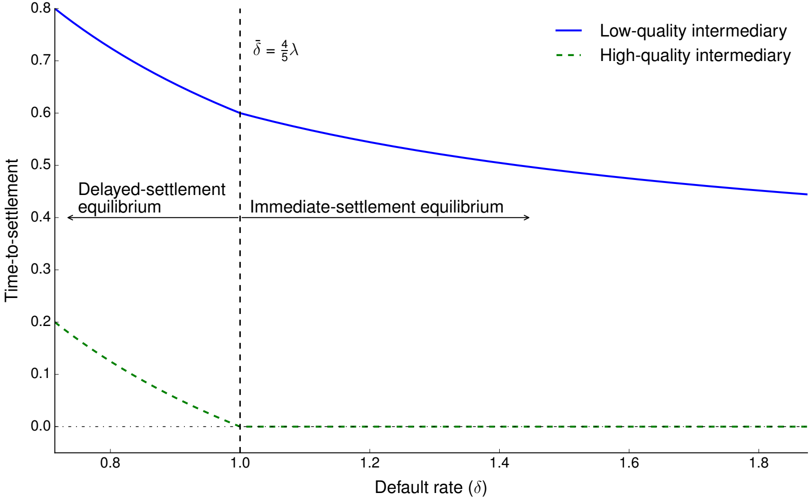
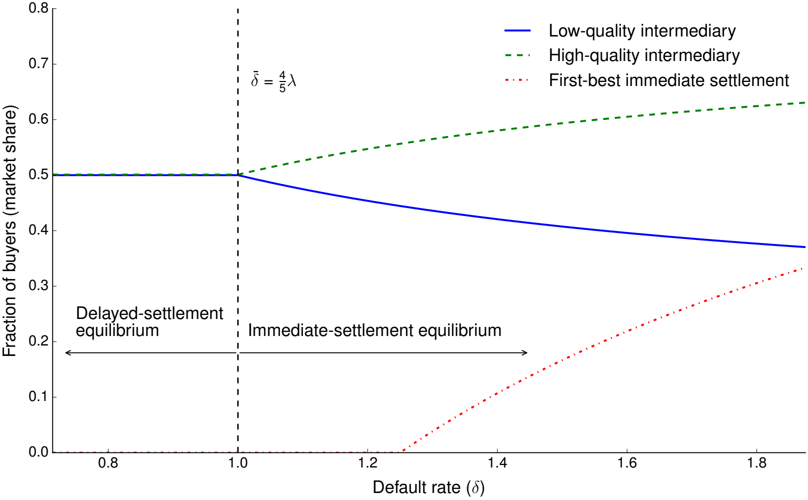
For the indifferent buyer,

$$U_{\mathbf{B}_m}(p_H, T_H) \quad = \quad U_{\mathbf{B}_m}(p_L, T_L).$$

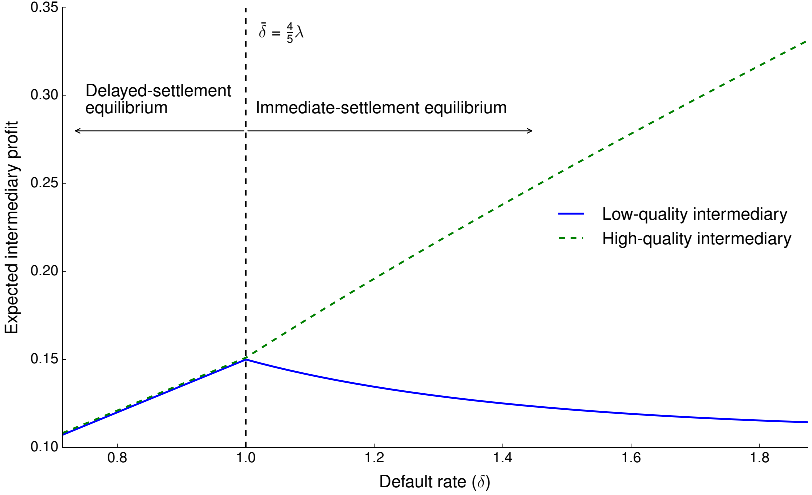
Imperfectly competitive market



Over-production of immediate settlement



Sell-side rents increase in default risk



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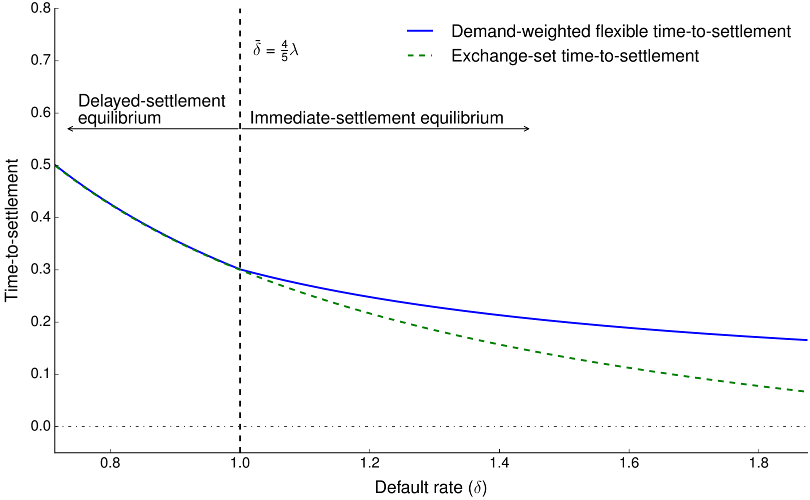
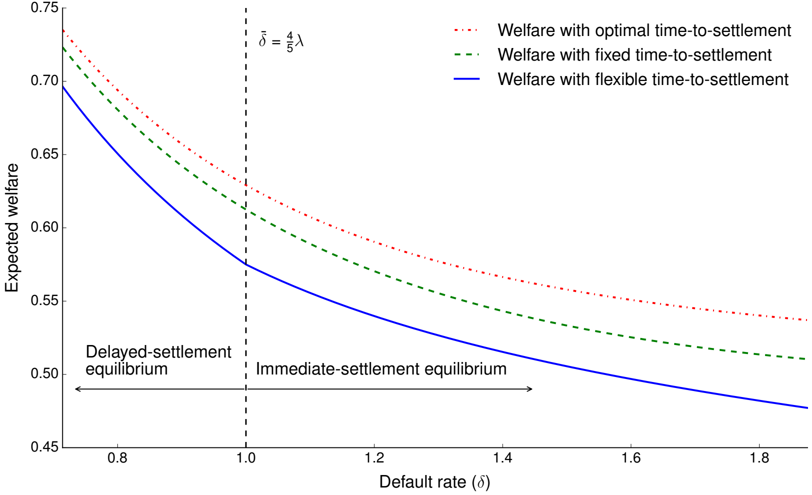
2. The two contracts offered are identical $\Longrightarrow$ buyers are indifferent.
3. The exchange sets the unique time-to-settlement to maximize total surplus:

$$\mathbb{E}\text{TradeSurplus}\,(T) = \int_1^2 v(1-\delta T)\,[\theta_i - (1-\lambda T)]\,\mathrm{d}\theta_i$$

Competitive markets settle slower on average



Welfare analysis



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4. Sell-side traders specialize in high (low) counterparty risk trades and earn excess rents. This can lead to poor risk management incentives and excess supply of immediate settlement.
5. An exchange-set (potentially dynamic) time-to-settlement maximizes price competition while still allowing for settlement flexibility.