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Reasonable royalties for complex technologies

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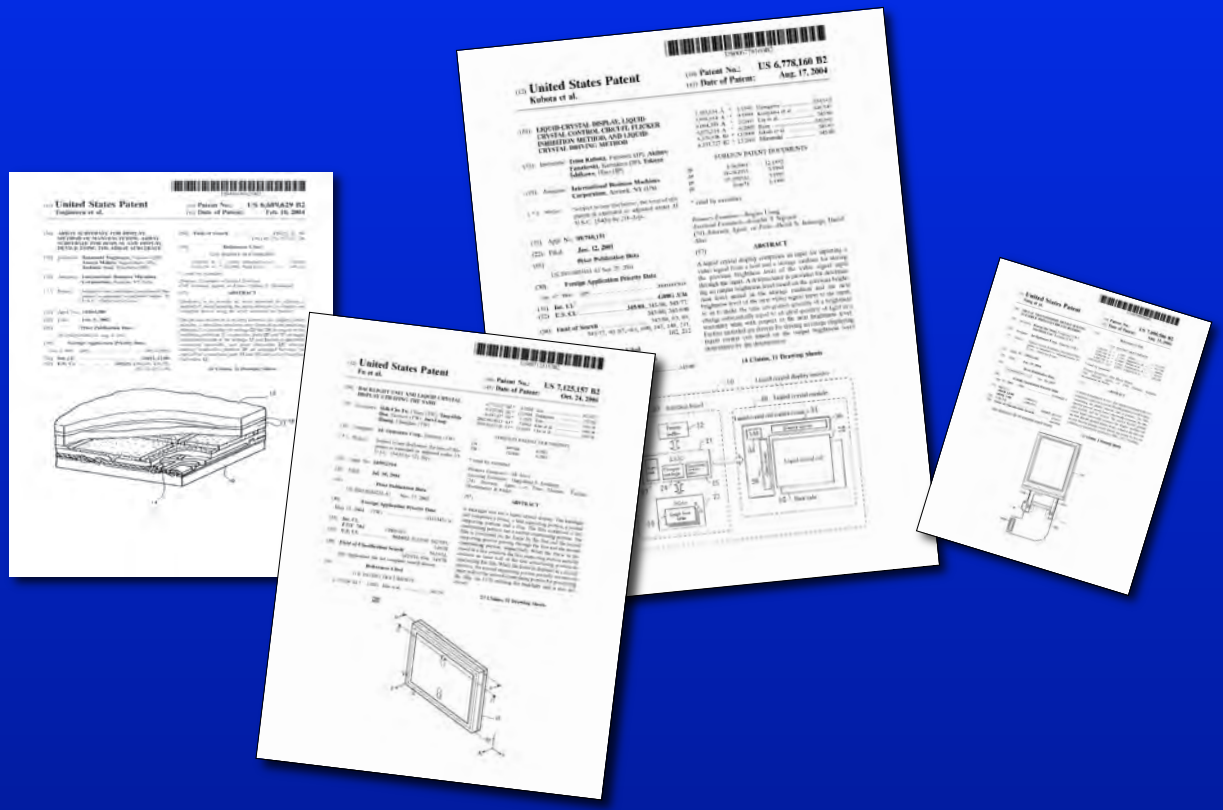
Complex technologies

- Typical fact pattern
  - System practices 100s / 1000s of patents
    - Developed by defendant
    - In-licensed from competitors / other third parties
  - Plaintiff asserts 1-10 patents
    - Claimed royalty base is the system
    - System "will not run" without claimed component
- Dominant paradigm is portfolio cross-license
  - Is there an "established royalty" / market price?
  - How to find it?

Case study: *LG Display v. AU Optronics*

- 2nd and 3rd largest makers of LCD panels
- U.S. patent portfolios (2008)
  - LGD: 2,438 patents
  - AUO: 1,032 patents
- In separate cases, each asserted ≥ 8 patents
  - Cases consolidated in Delaware
  - Limited to 4 patents each
  - Bench trial (Judge Farnan)

Problem: How to Value Four AUO Patents



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Four Principles

- Past conduct of the parties is the best indicator of the outcome of a hypothetical negotiation
- Analyze all the data—including cross-licenses
  - Licenses between competitors are different
- Symmetrical analysis
  - Each party is both plaintiff and defendant in the same proceeding
  - Focus on AUO's claim to illustrate the methods
- Asserted patents are part of a whole portfolio

Damages Methods

- Method 1
  - Price AUO's asserted patents based on their contribution to cross-licensing agreements
- Method 2
  - Apportion LGD's profits to reflect the contribution of the asserted AUO patents

Locate The Method Within *Georgia-Pacific*
Four groups of factors

I Actual licensing conduct

II Parties' profits from the technology

III Commercial advantages of the technology

IV Parties' relationship and bargaining position

Georgia-Pacific: Group I
Past licensing conduct

- Royalties received by plaintiff for the patent (1)
- Rates paid by defendant for comparable patents (2)
- The patent's duration and the term of the license (7)
- The plaintiff's licensing policy (4)
- The nature and scope of the hypothetical license (3)

Georgia-Pacific: Group IV
Commercial / bargaining relationships

- Parties' commercial relationship (5)
- Outcome of a hypothetical negotiation (15)
  - the amount that
    (1) a willing licensor would have agreed to accept,
    (2) a willing licensee would have agreed to pay,
    (3) at the time the infringement began

Georgia-Pacific Group I: Evidence
Non-price terms

- LCD licenses demonstrate consistent non-price terms
  - Cross-licenses to competitors (factor 5)
  - Non-exclusive licenses to entire portfolio (factor 3)
  - Worldwide geographic scope (factor 3)
  - Multi-year (or life-of-patent) terms (factor 7)
  - Paid-up licenses (not running royalty) (factor 7)

Georgia-Pacific Group I: Evidence
Price Terms

- Industry practice
  - Balancing payment between competitors
  - The net of claims each firm makes on the other

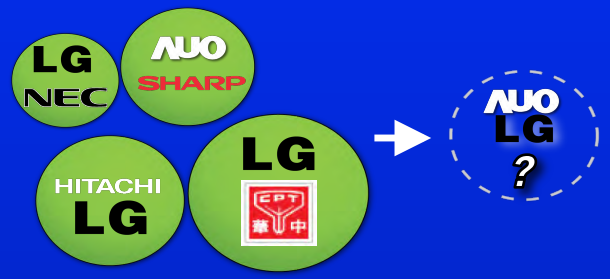
- Example

  Competitor A owes Competitor B $100 million
  Competitor B owes Competitor A $40 million

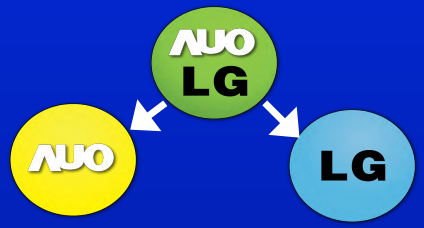
  → A pays B $60 million balancing payment

Method 1 – Three Steps

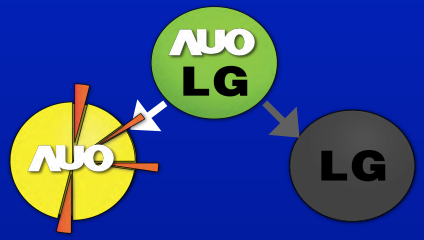
1. Predict the balancing payment between the parties



2. Decompose the balancing payment into component claims



3. Compute value shares for each party's patents



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Explain Industry Cross-License Payments

Regression analysis identifies significant factors

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Explain Industry Cross-License Payments

Regression analysis predicts an AUO-LGD deal

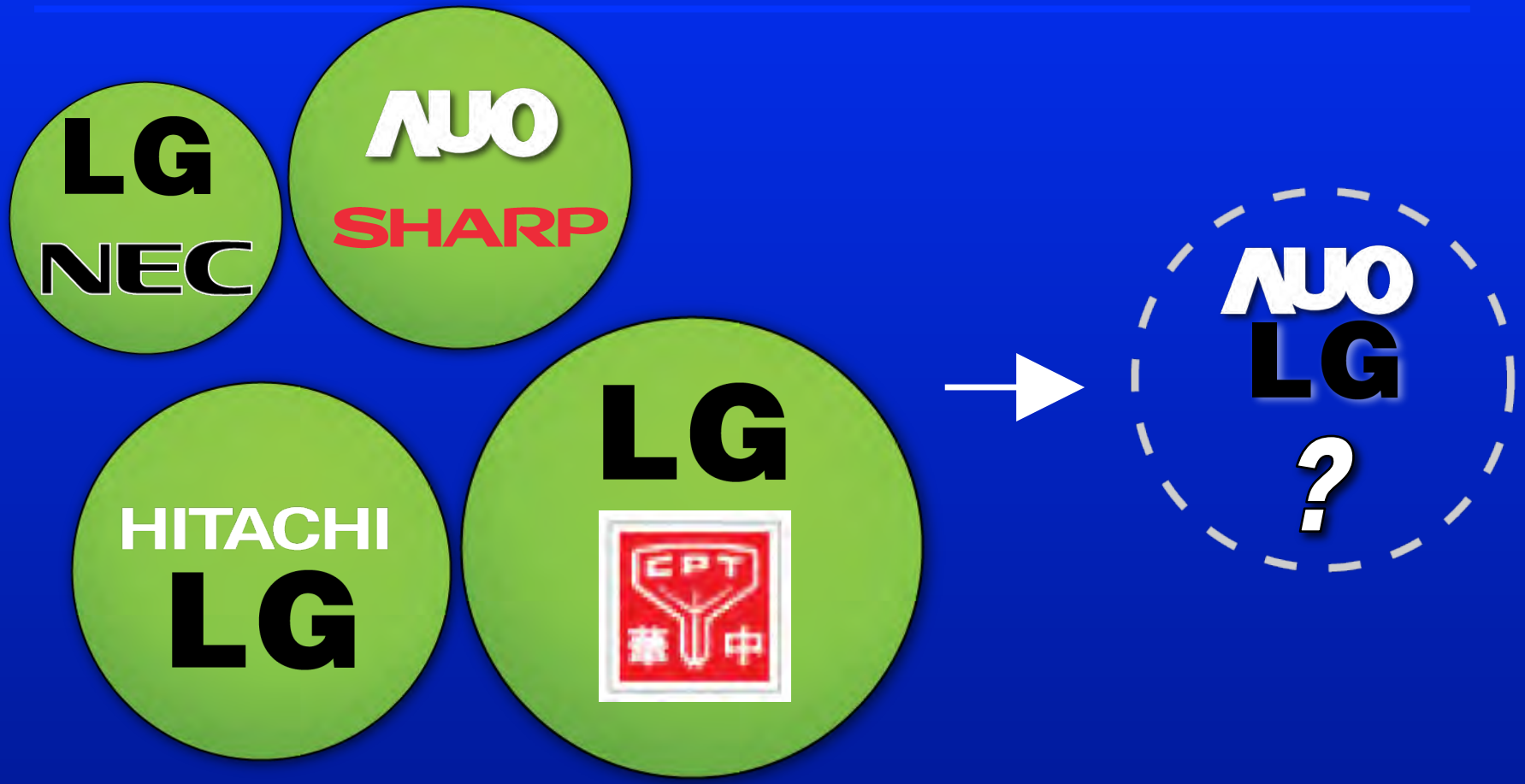

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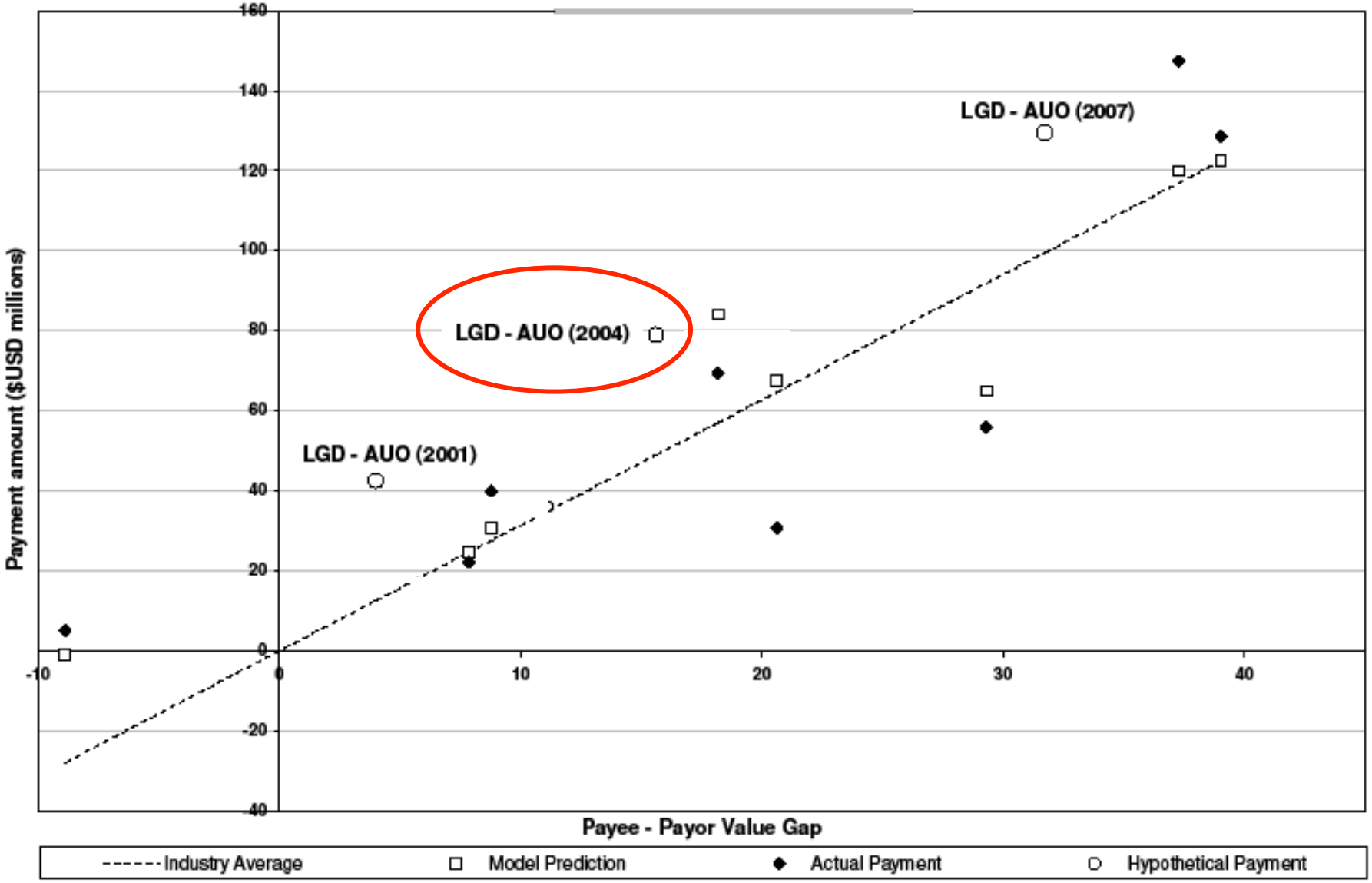
Figure 1.1
Actual and predicted balancing payments



Notes:
See Exhibit 16.1 and Exhibit 17.1. Value gap in trillions. Cross-license agreements are labeled as "Net payee - net payor."

Predicted Outcome of an AUO-LGD Deal

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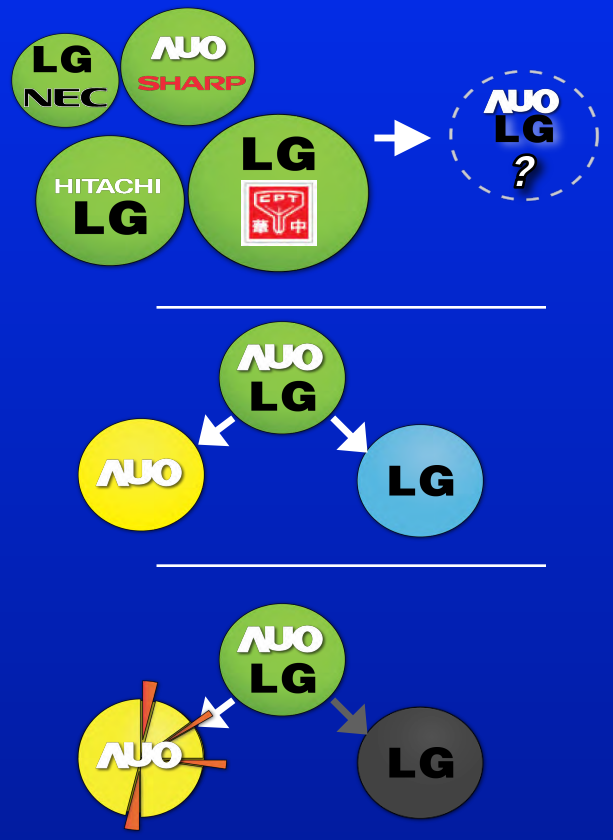
Method 1 – Three Steps

1. Predict the balancing payment between the parties

2. Decompose the balancing payment into component claims

3. Compute value shares for each party's patents



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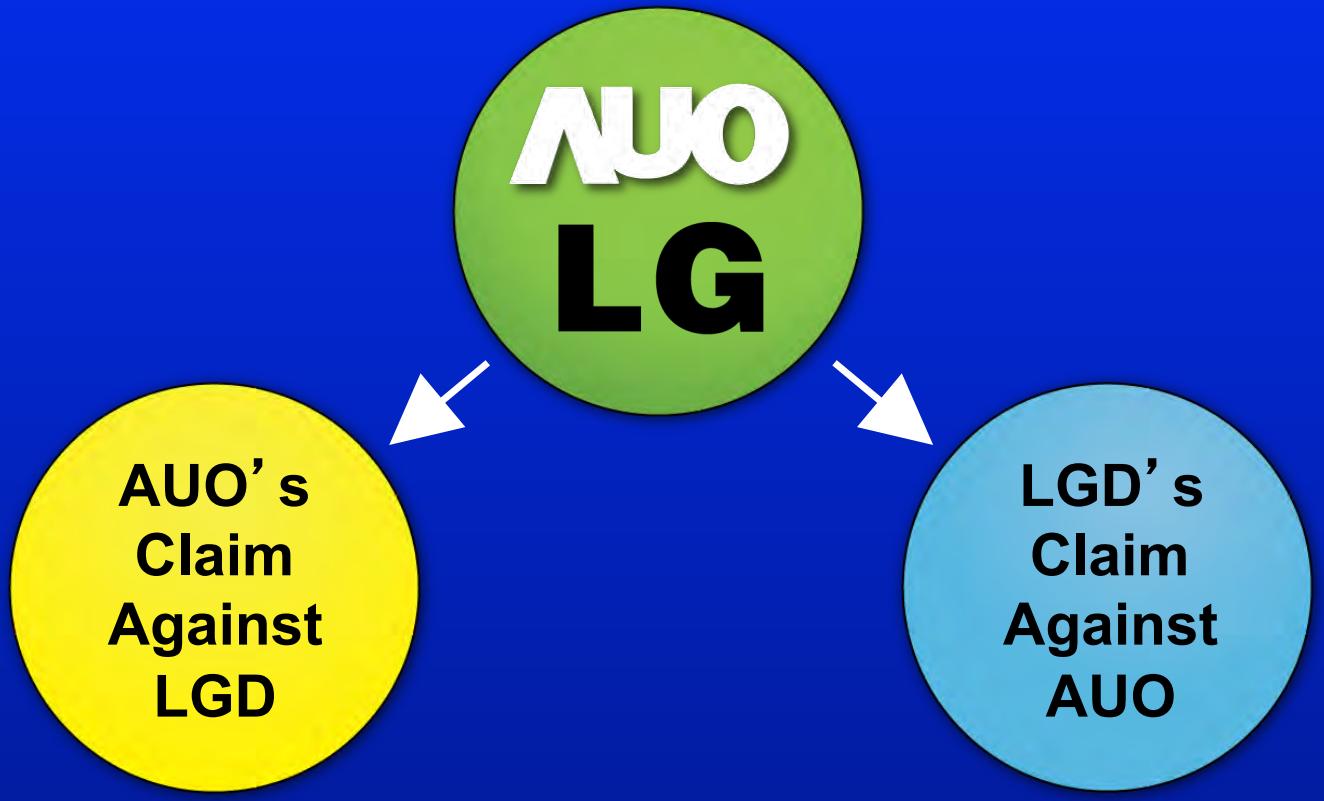
Decompose the Balancing Payment

Regression analysis identifies the component claims



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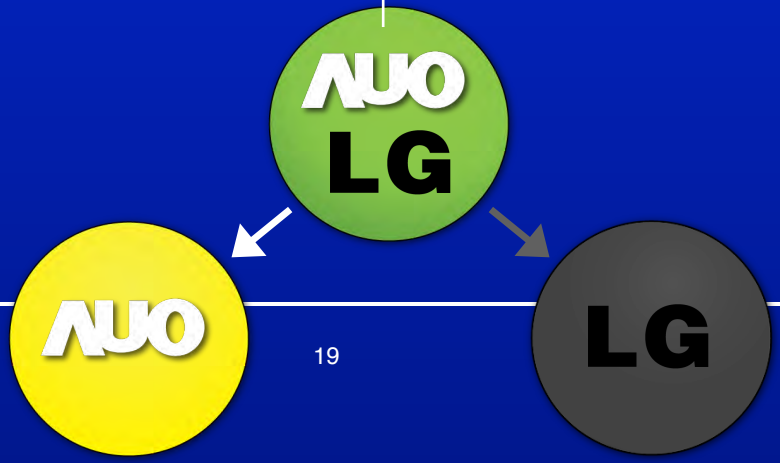
Determine Each Party's Claim

$	42,201M	(LGD sales)
x	265	(AUO patents)
x	3.14	(avg. rate)
=	$35.1M	
+	($3M)	(AUO effect)
=	$32.1M	(LGD owes AUO)

$	33,971	(AUO sales)
x	789	(LGD patents)
x	3.14	(avg. rate)
=	$84.1M	
+	$26.9M	(LG effect)
=	$111.0M	(AUO owes LGD)



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Restrict AUO's Worldwide Claim to Accused LGD US Sales

Regression Model
Predicts Worldwide Balancing Payment

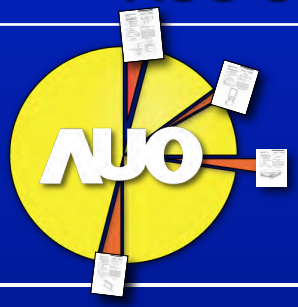
↓

Restrict to Accused US Sales

↓

Determine Value Share of Asserted Patents

$ 32.1 M	AUO WW claim
x 24.7%	LGD US sales
x 75.8%	Accused sales
= $6.0 M	AUO US claim



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Method 1 – Three Steps

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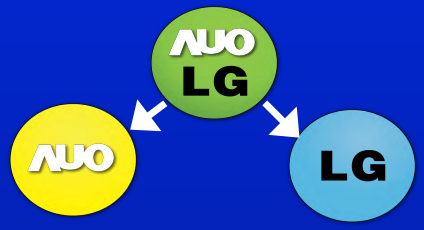

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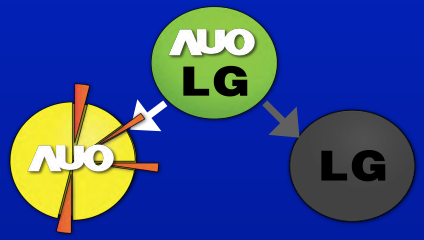

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Value Shares of Asserted Patents
The "Count, Rank and Divide" method

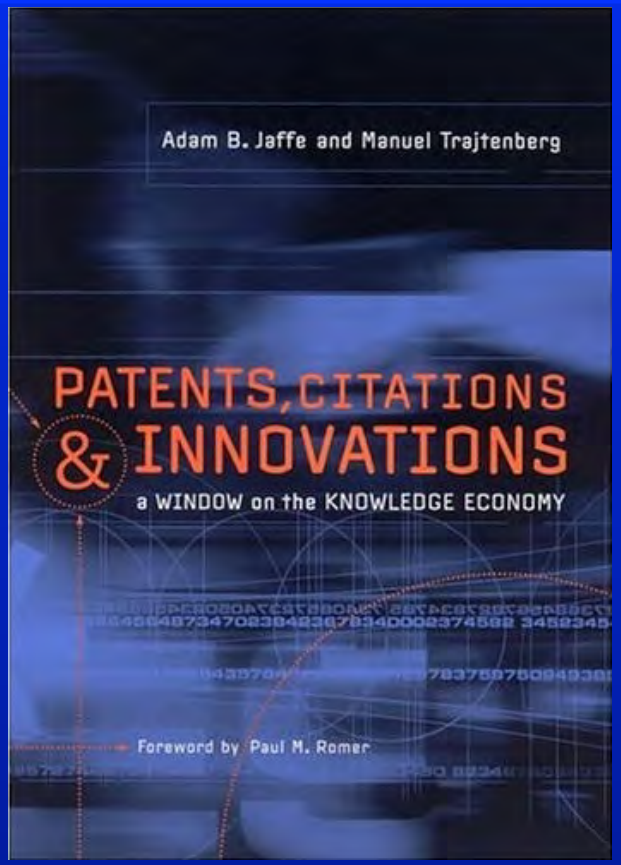
- **Count**
  - How many patents are in the portfolio
- **Rank**
  - Each patent by an objective indicator of importance
- **Divide**
  - The value of AUO's claim into shares for each patent

Georgia-Pacific: Group III
Commercial advantages of the invention

- The nature of the invention and its benefits (10)
- Advantages of the invention over old modes or devices (9)
- Extent of defendant's use of the invention (11)

The "Count, Rank and Divide" Method
2 Rank the patents in order of importance

- **Problem: how to rank an entire portfolio of patents**
- **Solution: use counts of citations in later patents**
  - **Adjusted for age**
- **Studies: more valuable patents are highly cited**
  - **Averaged over large samples**



MIT Press 2002

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The "Count, Rank and Divide" Method
3 Divide AUO's claim into each patent's share

- **Problem: how to map rankings to value shares**
- **Solution: use large-sample patent value distributions**
  - **Use actual industry behavior**
- **Studies: distribution of value is highly skewed**

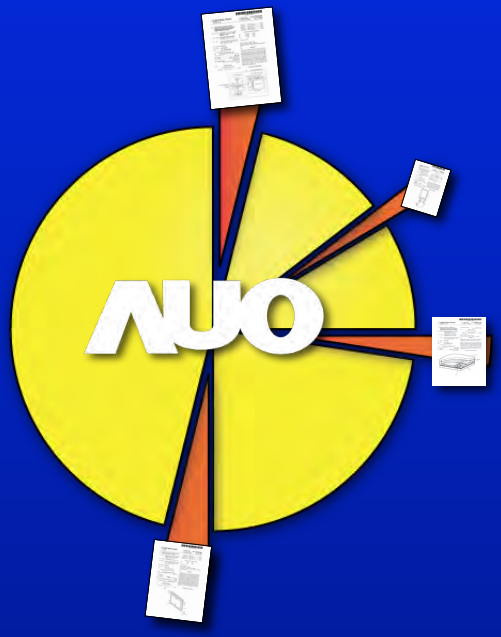
THE JOURNAL OF INDUSTRIAL ECONOMICS

Volume XLVI DECEMBER 1998 No. 4

JEAN O. LANJOUW, ARIEL PAKES and JONATHAN PUTNAM
How to Count Patents and Value Intellectual Property: The Uses of Patent Renewal and Application Data 405

Value Shares of 4 Asserted AUO Patents

Patent	Value Share	Contribution to a Hypothetical License
'629	.37%	22k
'160	.32%	19k
'157	.06%	4k
'506	.01%	0.5k



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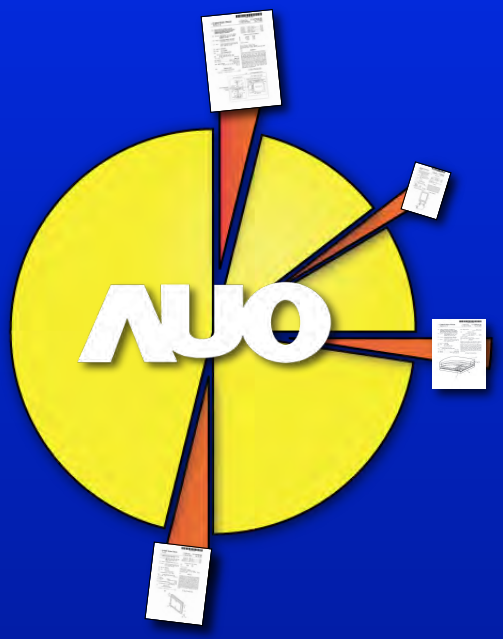
Method 1 – Damages Payments

Patent	Method 1 Industry Price
‘629	22k—148k
‘160	19k—130k
‘157	4k—24k
‘506	0.5k—3.5k



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Damages Methods

- Method 1
  - Price AUO's asserted patents based on their contribution to cross-licensing agreements
- Method 2
  - Apportion LGD's profits to reflect the contribution of the asserted AUO patents

Georgia-Pacific Group II
Parties' profits from the technology

- Established profitability of the patented product (8)
- Portion of defendant's profit credited to invention (13)
  - as distinguished from defendant's own contributions
- Invention's share of profit customary in industry (12)
- Effect of selling the patented product on defendant's ability to sell other products (6)

Method 2 – Apportionment of Profits

LGD Profits

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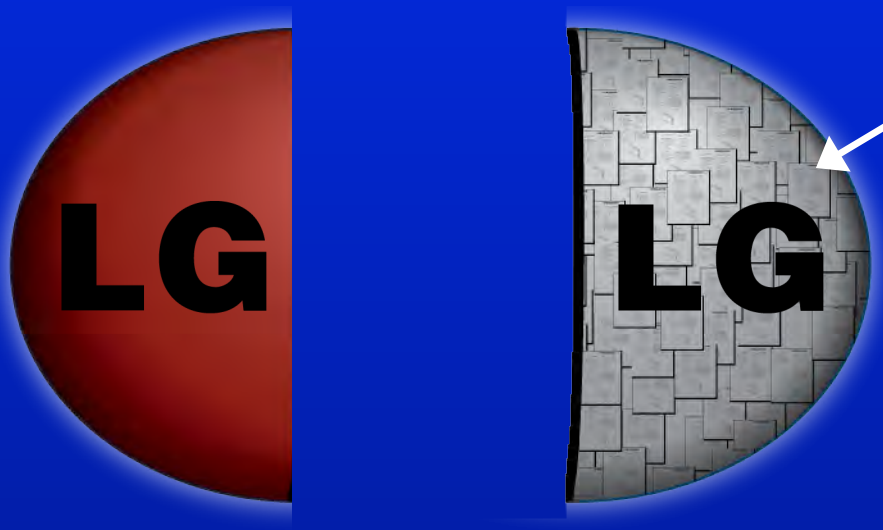
Method 2 – Apportionment of Profits

LGD Profits



LGD Profits Attributable to Patents

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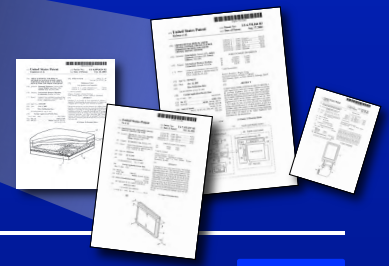
Method 2 – Apportionment of Profits

Identify the contribution of AUO patents

LGD Profits

AUO Asserted Patents



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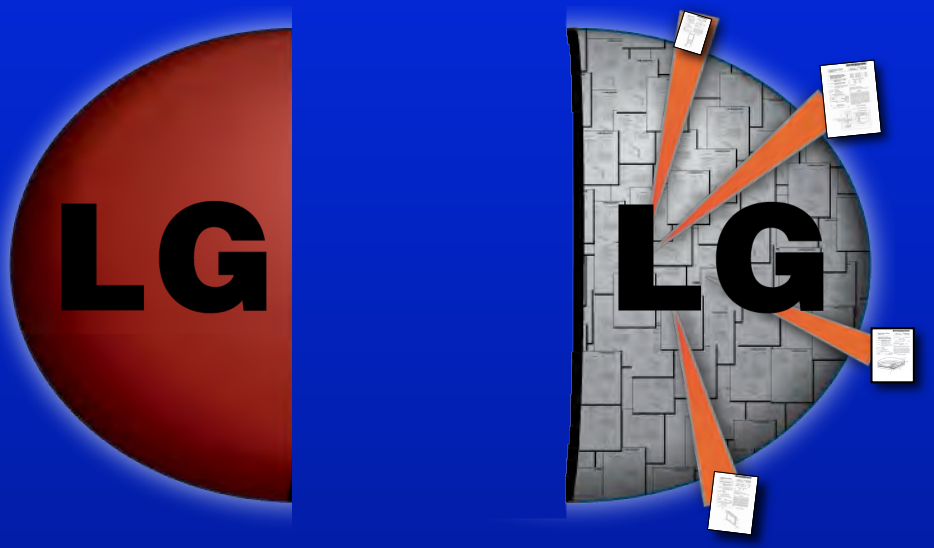
Method 2 – Apportionment of Profits

"Count, Rank, and Divide" gives each patent's share

LGD Profits



AUO Asserted Patents

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Conclusions – Reasonable Royalty

Patent	Method 1 Industry Price	Method 2 Apportionment
‘629	22k—148k	330k—3.8M
‘160	19k—130k	288k—3.3M
‘157	4k—24k	53k—616k
‘506	0.5k—3.5k	7.7k—89k

Comparison Of Licensing Data With Expert Opinions