Bigger is Not Necessarily Better: The Practice and Performance of Major Homebuilders

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Harvard Distribution Study

- The Harvard Distribution Study a collaborative project of the Joint Center for Housing Studies and the Harvard Center for Textile and Apparel Research, funded by the JCH, the Alfred P. Sloan Foundation, and the NAHB National Housing Endowment
- This research represents the collective work of:
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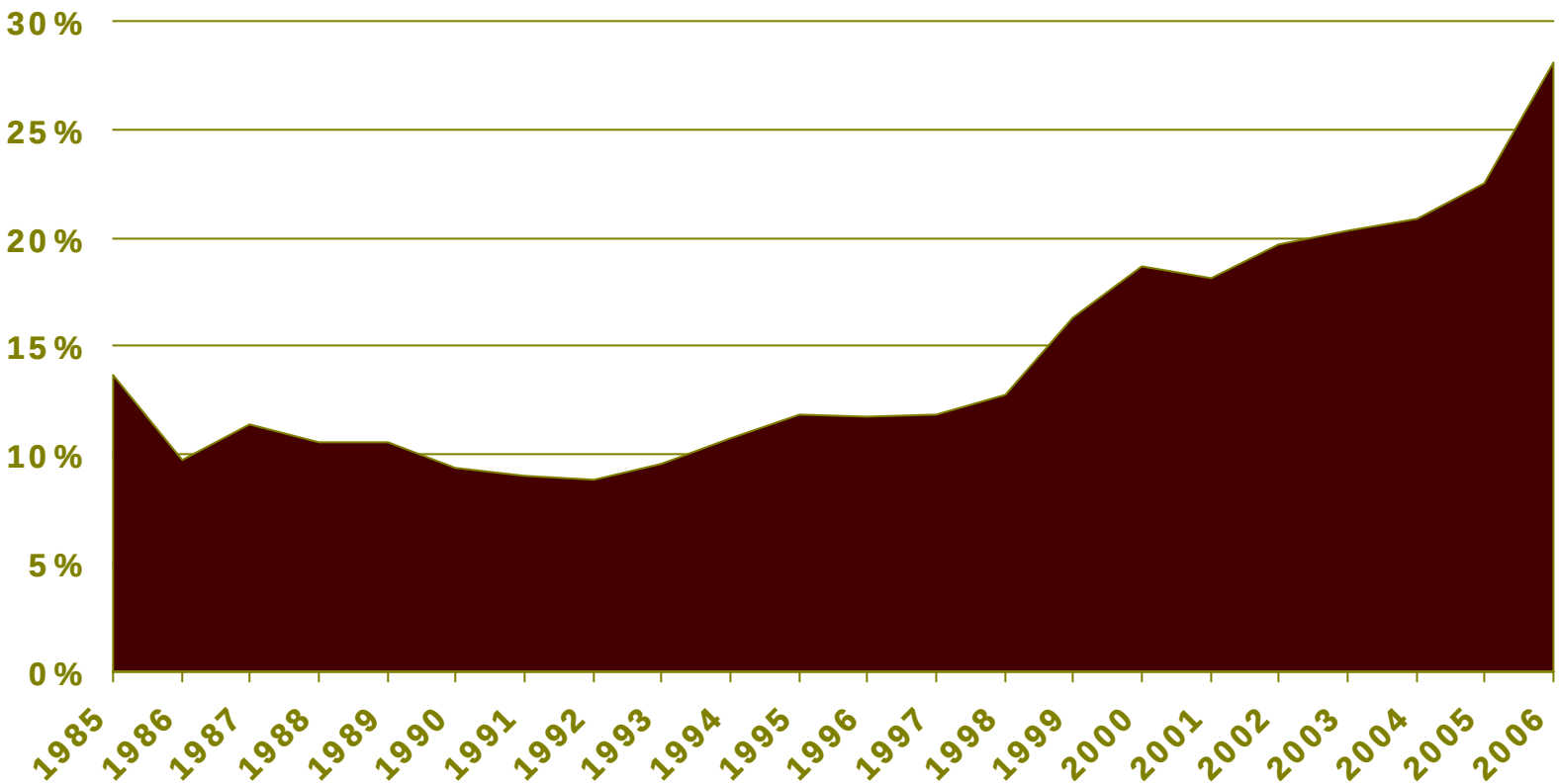
Overview

- Concentration of homebuilding
- Is bigger better?
- Managing land development
- Managing the construction worksite
- Managing the supply chain
- Overall performance
- Implications for the future

Growth Over Time of the Largest Homebuilders

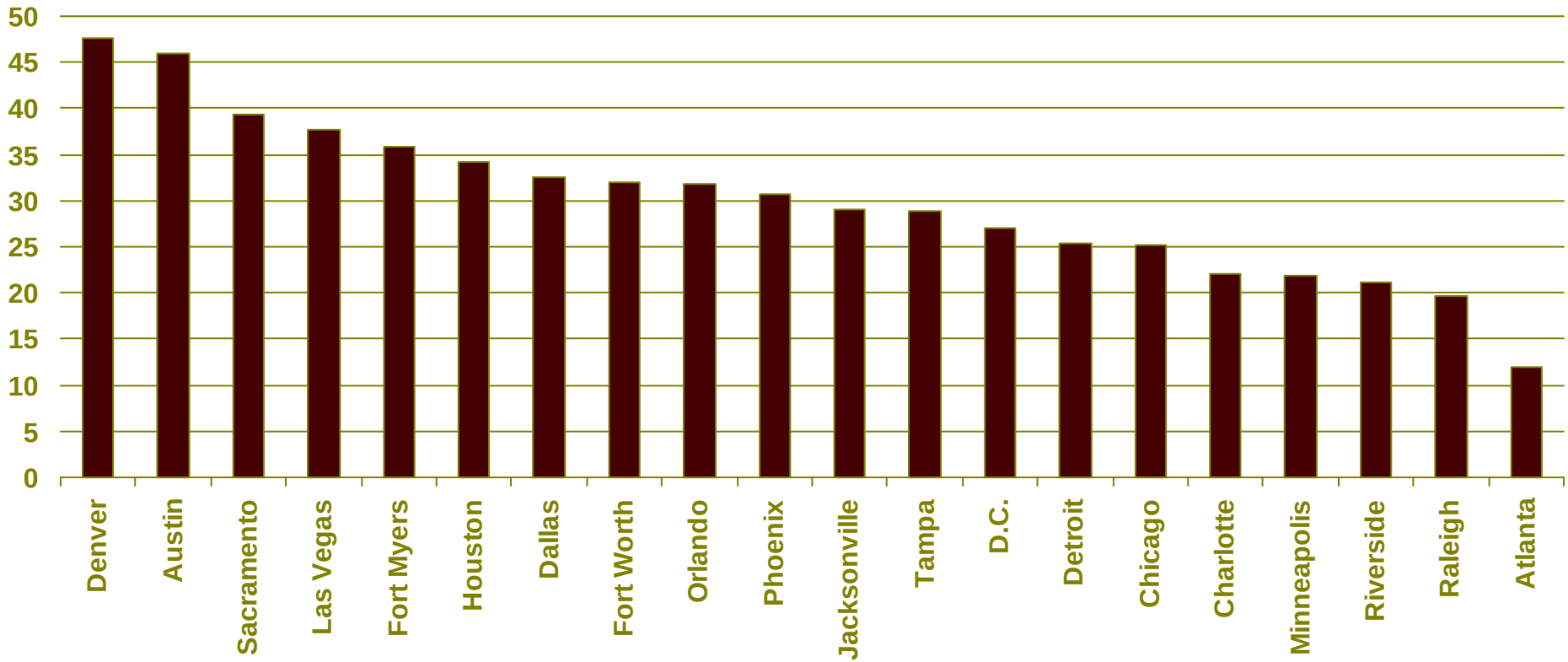
Share of new single-family homes sold by top 10 U.S. homebuilders



Source: Joint Center tabulations of Builder magazine's "Builder 100."

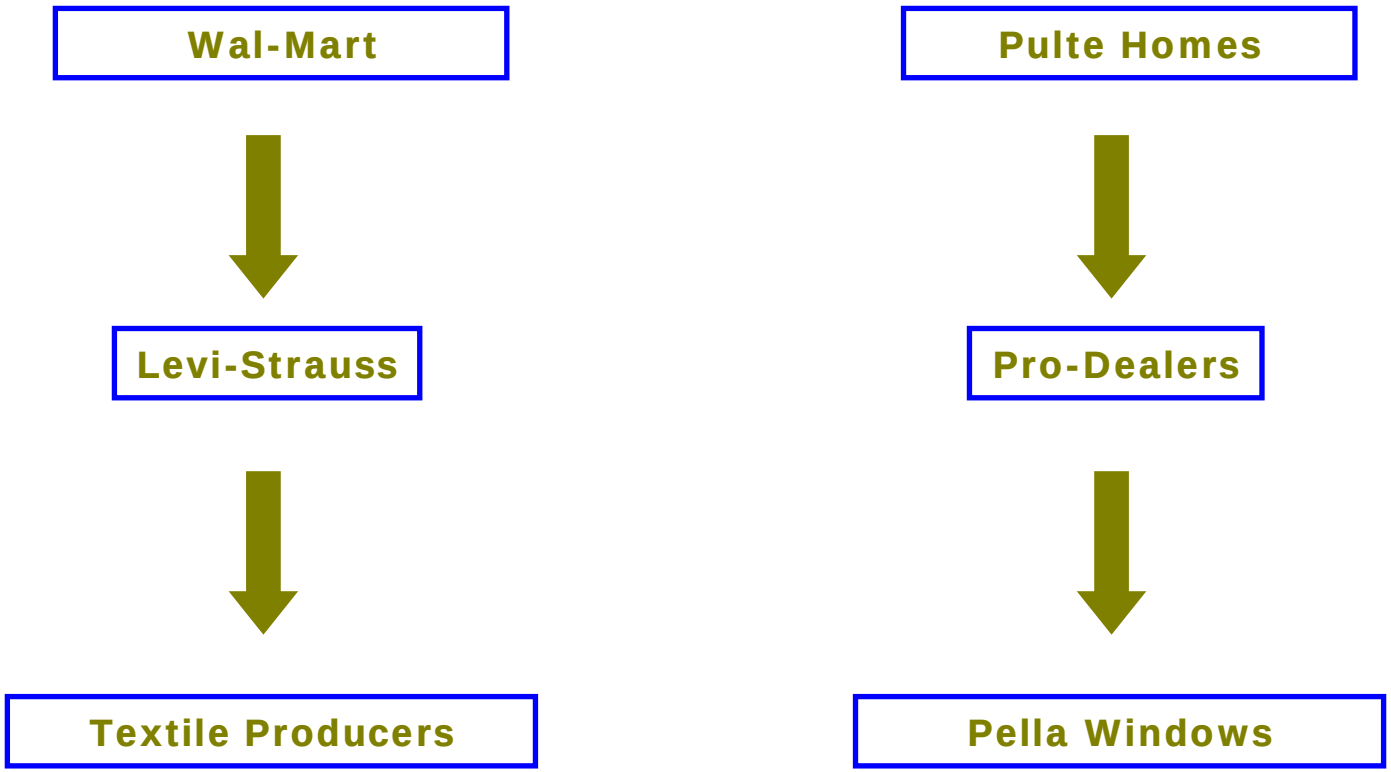
Most Metro Markets Are Even More Concentrated

Top 5 builder share of total permits for top 20 markets in U.S. by 2004 construction levels



Source: Hanley Wood Market Intelligence

Impacts of Scale: Earlier Work in Retail Supply Chains and the Homebuilding Distribution Channel



Distributor Study: Large Builders Increasingly Driving Changes in the Supply Chain

Share of residential sales, average for companies, weighted by sales volume

	Large Pro	
	1997	**2002**
Homebuilders: 500+ homes	11.6%	19.8%
25 – 499 homes	24.2%	32.3%
1 – 25 homes	27.8%	20.6%
Multifamily builders	6.2%	5.9%
Remodeling contractors	24.1%	18.1%
Homeowners	6.0%	3.2%

Source: Harvard University Building Products Distribution Study.

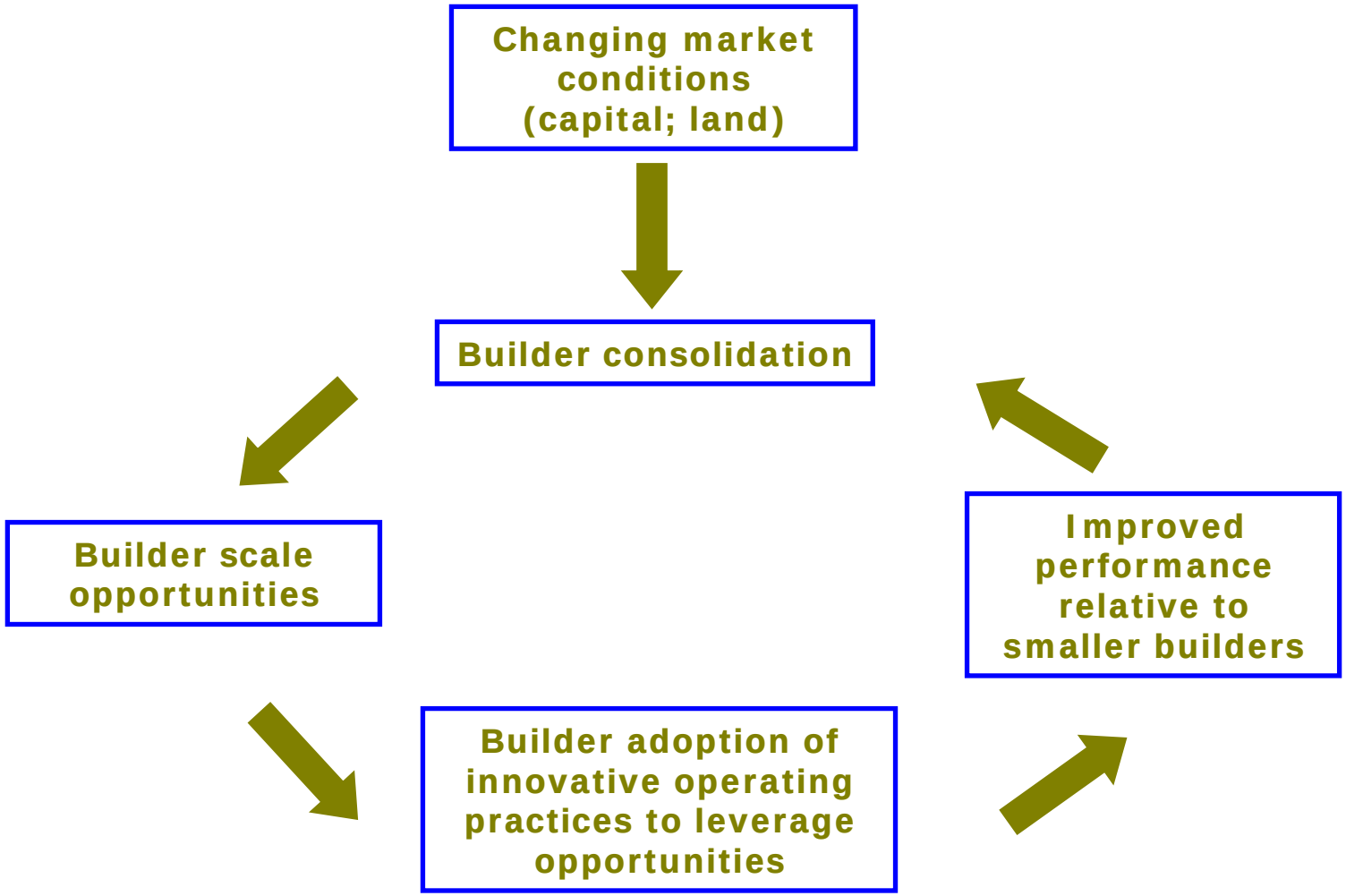
Distributor Study: Supply Chain Changes Driven by Large Builders

Percent of large pro dealers offering service, averages (not weighted)

Prefabrication/Preassembly Services	**Builders – 500+ Units**	
	1997	2002
Framing	0%	16.7%
Manufactured Panels	22.7%	43.3%
Whole House Design	9.1%	16.7%
Installation Services		
Panels	9.1%	26.7%
Doors/Windows	13.6%	53.3%
Roofing	9.1%	10.0%

Note: The purpose of this table was to investigate practices across the range of distributors, so responses were weighted by businesses, not sales revenue.
Source: Harvard University Building Products Distribution Study.

Research Hypothesis – From Consolidation to Innovation to Performance



Builder Performance Improves

Median values for entry level homes across all builder divisions that provided responses for both 1999 and 2004.

	1999	2004
Gross margins	19.0%	23.8%
Net income (share of revenue)	6.9%	10.9%
Customer satisfaction (% willing to recommend)	80%	90%

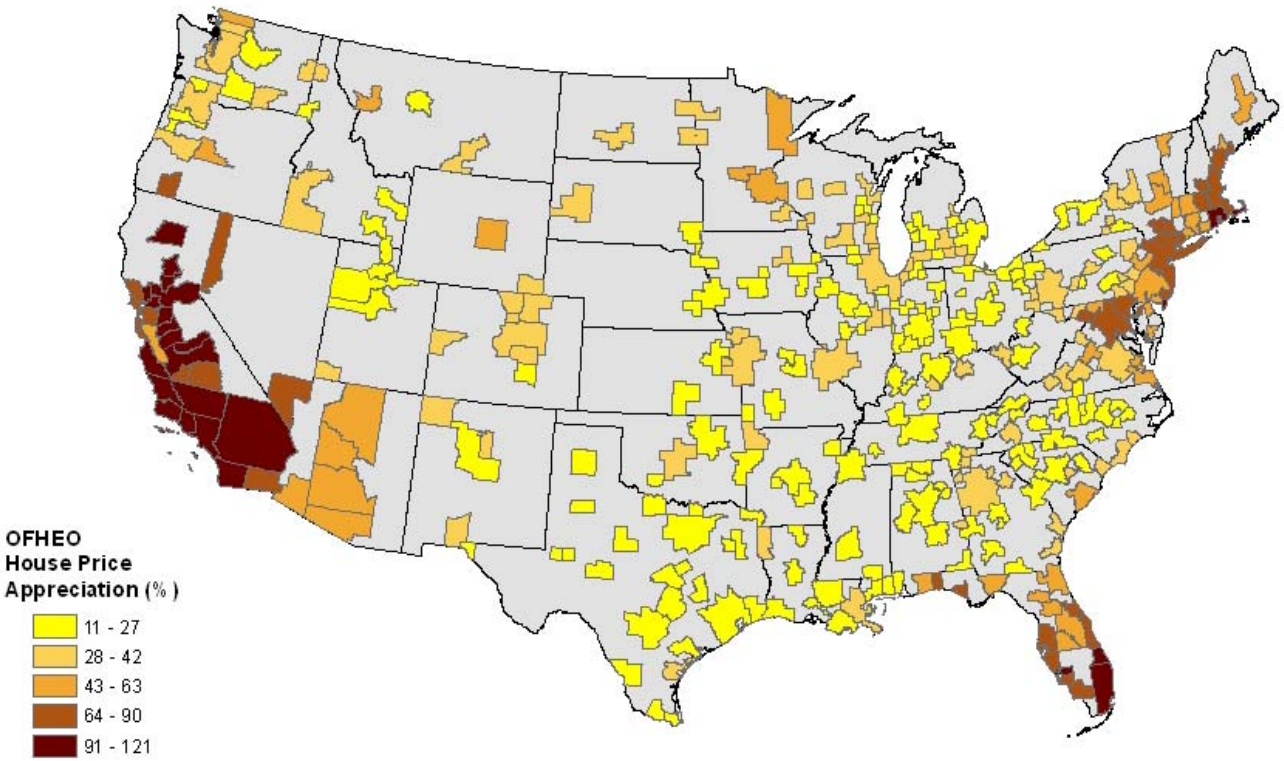
* Inflated by CPI to estimate 2004 level.

Source: Harvard Builder Study, Division Survey.

Builder scale and market appreciation as drivers of practice and performance

- In most operational areas we examine, scale is not the driver of practice and performance: Markets (price appreciation) seems the key.
- We look at major practices:
  - Land acquisition and management
  - Construction coordination and building
  - Information technology practices
  - Supply chain activity
- Compare homebuilder practice and performance by size and market.

All Housing Markets are Not the Same: House Price Appreciation for Major Metros, 1999-2004



Notes: House price appreciation is defined as the percent change in house prices over a five year period ending on December 31, 2004. Values for metropolitan statistical areas and metropolitan divisions are provided by OFHEO's House Price Index (HPI), which is based on transactions involving conforming, conventional mortgages purchased or securitized by Fannie Mae or Freddie Mac. Only mortgage transactions on single-family properties are included in the HPI. Metropolitan statistical areas and divisions are December 2003 definitions by the Office of Management and Budget.
Source: Office of Federal Housing Enterprise Oversight, 4Q 2004 House Price Index. See http://www.ofheo.gov/media/pdf/4q04hpi.pdf.

Payments to Subcontractors Dominate Builder Expenses

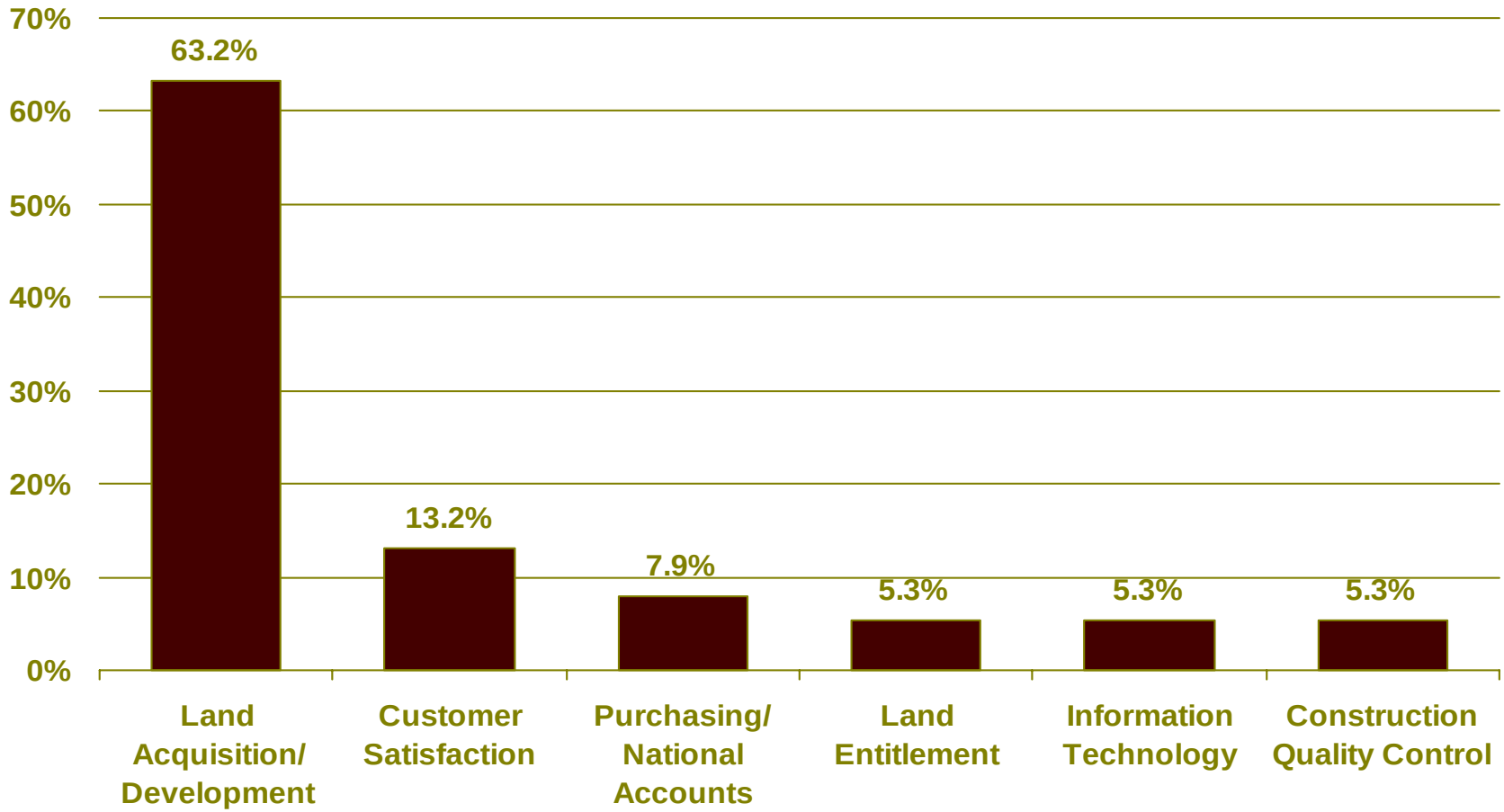
Percent of expenses, 2004; averages across builder divisions

Payments to subcontractors (including materials subcontractors purchase directly)	38.8%
Land purchase / development / entitlement	24.7%
Products and materials purchased by builder	12.2%
Sales and marketing	8.1%
Corporate overhead	6.4%
On-site labor on payroll of company	4.2%
Financing	3.4%
Other	2.2%

Source: Harvard Builder Study, Division Survey.

Land Acquisition / Development Activities Increase Most in Importance

Percent of corporate offices ranking function as increasing in importance the most



Source: Harvard Builder Study, Corporate Survey.

Builders Have Increased Share of Homes Pre-sold Before Beginning Construction

Percent of homes pre-sold before beginning construction, averages across builders surveyed with responses in both 1999 and 2004

Builder Size (Number of homes built in 2004)	**1999**	**2004**
500 – 999 homes	71%	68%
1,000 – 2,499 homes	55%	64%
2,500 – 9,999 homes	76%	76%
10,000 or more	75%	82%
All builders surveyed	70%	73%

Source: Harvard Builder Study, Corporate Survey.

Larger Builders in Higher Appreciation Markets Generally Have More Aggressive Land Practices

Average aggressive land practice score

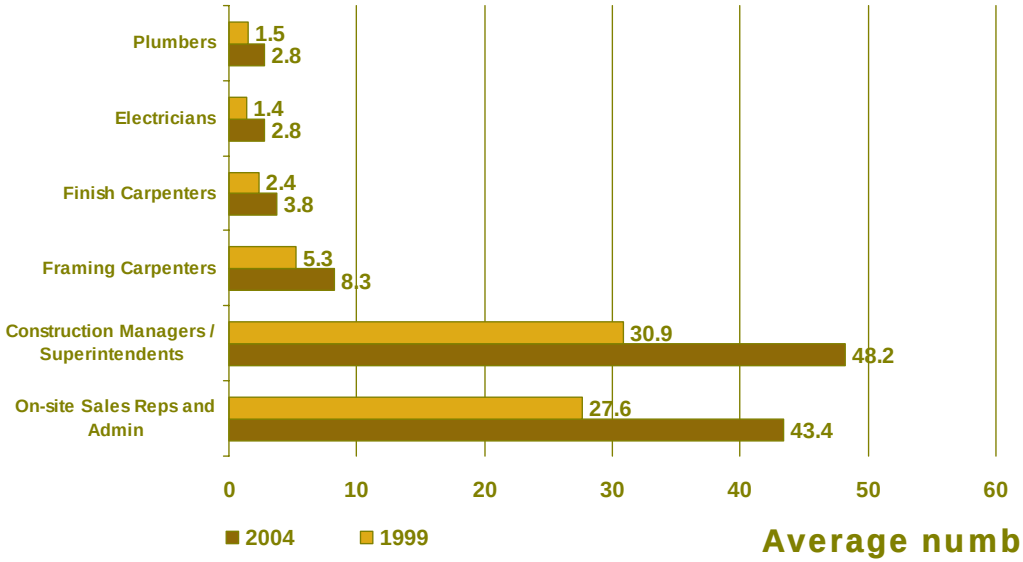
Division Size (Number of homes built in 2004)	**Lower Appreciation Markets**	**Higher Appreciation Markets**	**All Markets**
Smaller (<1,000)	6.6	6.6	6.6
Larger (>=1,000)	7.3	10.0	8.0
All Divisions	6.9	7.3	7.0

Note: Differences are not significant at the .05 level.

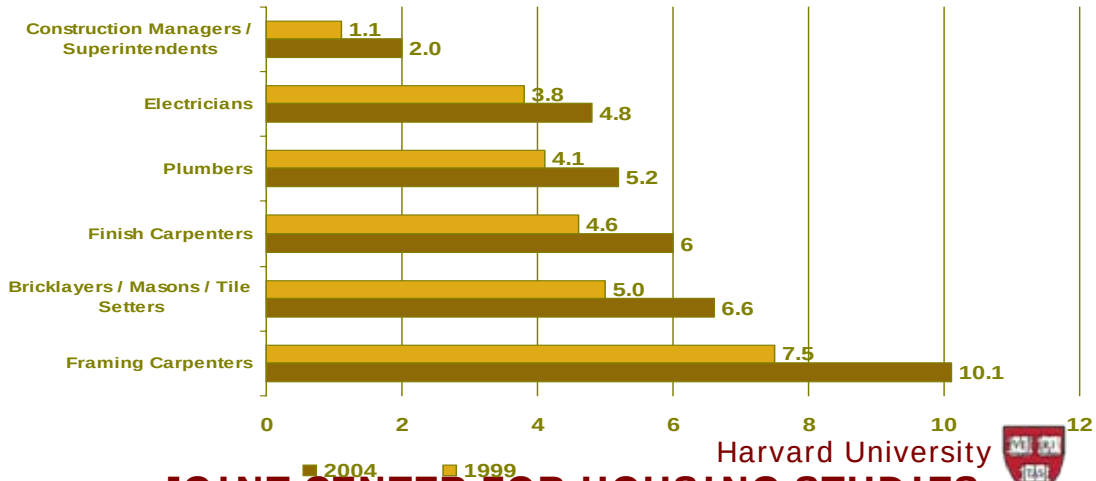
Source: Harvard Builder Study, Division Survey.

Homebuilders are construction managers

Average number of personnel on payroll among builder divisions



Average number of subcontracting firms hired among builder divisions



Source: Harvard Builder Study, Division Survey.

Homes Sold per Number of Construction Managers, 2004

Average number of homes sold per manager among divisions

Division Size (Number of homes built in 2004)	**Lower Appreciation Markets**	**Higher Appreciation Markets**	**All Markets**
Small (<500)	17	20*	13
Medium (500-999)	21	25	24
Large (1,000+)	28	28	28
All Divisions	23	22	23

Note: Observations are matched across years.

Source: Harvard Builder Study, Division Survey.

Method that Specialty Trade Work Awarded to Subcontractors

Percent of divisions awarding work to special trades by market type

	Lower Appreciation Markets			Higher Appreciation Markets		
	Open Competitive Bid	Restricted Bid	Affiliated Subs	Open Competitive Bid	Restricted Bid	Affiliated Subs
Framing Carpenters	22	47	31	9	87	4
Finish Carpenters	21	48	30	13	83	4
Electricians	21	64	15	4	91	4
Plumbers	21	64	15	4	91	4

Source: Harvard Builder Study, Division Survey.

Subs Access to Schedule Not Related to Scale

Percent of divisions in category whose subcontractors have access to the schedule

Division Size (Number of homes built in 2004)	Lower Appreciation Markets	Higher Appreciation Markets	All Markets
	%	%	%
Small (<500)	56%	20%	43%
Medium (500-999)	82%	62%	71%
Large (1,000+)	67%	40%	59%
All Divisions	69%	48%	60%

Source: Harvard Builder Study, Division Survey.

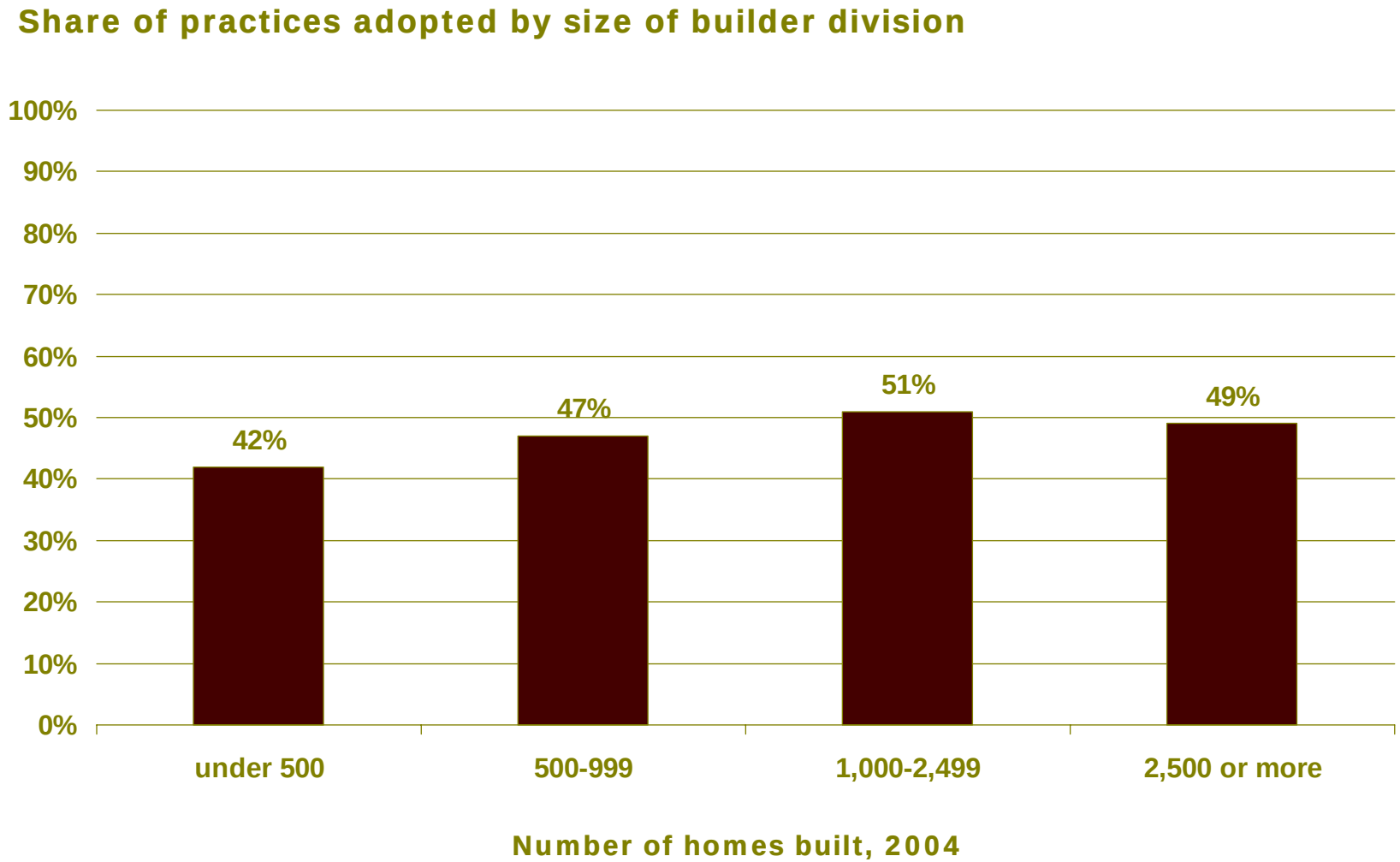
Adoption of Innovative Supply Chain Practices Somewhat Higher Among Largest Builders

Average adoption rates for divisions by size of corporate parent

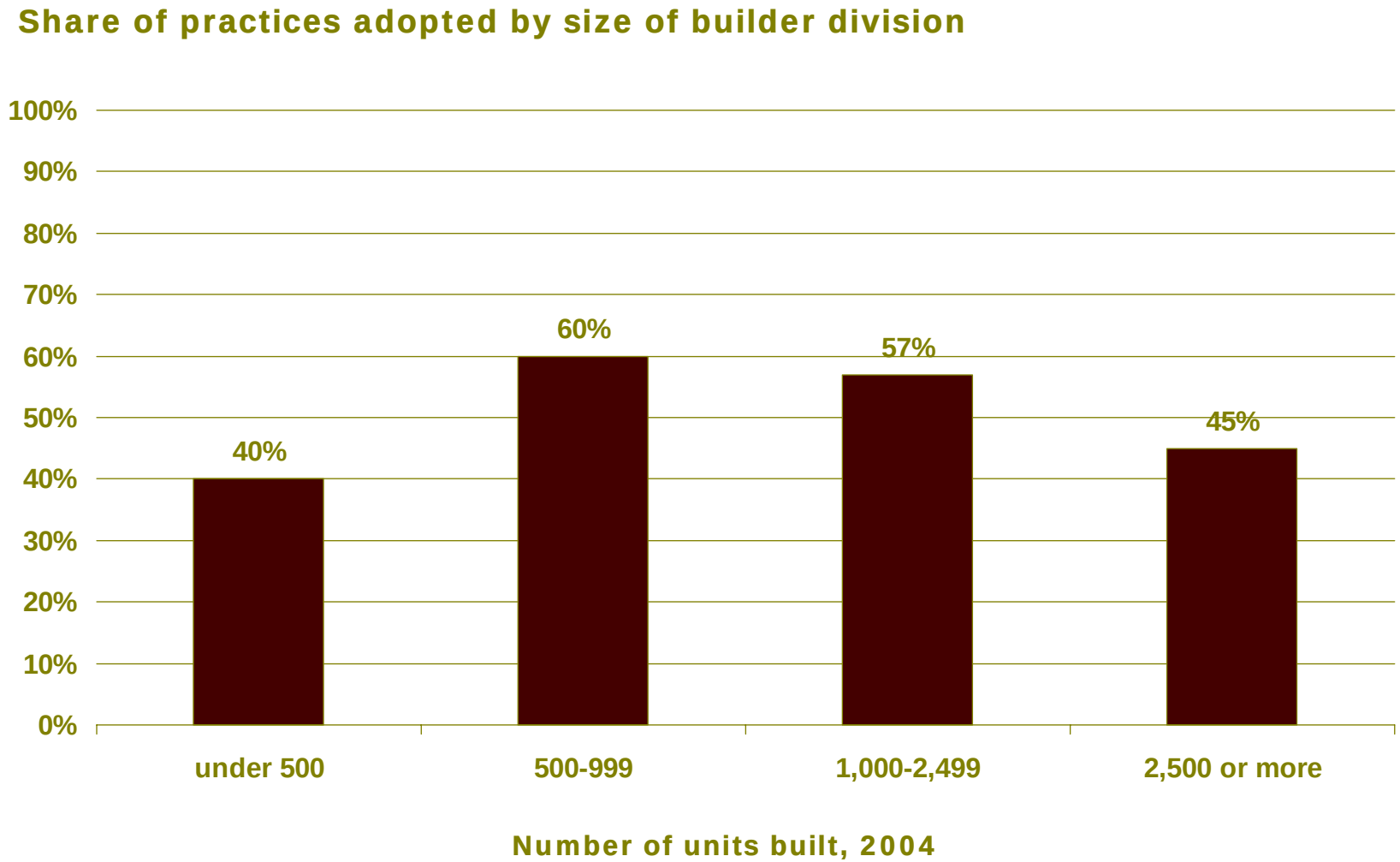
Size of Corporate Operations (Number of homes built in 2004)	Pre-Assembly	Install	Supply Chain	Overall
All builder divisions	47%	53%	47%	49%
Under 1,000	46%	52%	47%	48%
1,000-2,499	39%	41%	33%	38%
2,500 - 9,999	44%	48%	44%	45%
10,000 or more	51%	62%	55%	56%

Source: Harvard Builder Study, Division Survey.

But Generally, Adoption Seems Independent of Size: Advanced Preassembly Practices



Advanced Installation Practices



Builders in High Appreciation Markets Rely More on Subcontractors (less likely to engage supply chain)

Percent of divisions purchasing product by market appreciation categories

	OSB / Plywood / Sheathing		Wallboard		Siding		Windows	
	Market Appreciation		Market Appreciation		Market Appreciation		Market Appreciation	
	Low	High	Low	High	Low	High	Low	High
Lumber / Building Material Dealer	73	40	21	0	40	16	18	4
Direct from Manufacturer	7	8	0	0	6	0	40	24
Subcontractor	21	52	67	84	30	68	15	48
Other	0	0	12	16	24	16	27	24

Source: Harvard Builder Study, Division Survey.

Advanced Supply Chain Practices More Likely to be Implemented in Low Appreciation Markets

Percent of divisions of large builders

Advanced Supply Chain Practice Score	Lower Appreciation Markets	Higher Appreciation Markets	All Markets
Low (6 or less of 13)	22%	78%	100% (N=9)
High (7 or more of 13)	70%	30%	100% (N=10)
Total	47%	53%	100% (N=19)

Note: Large builders are defined here as having built 10,000 or more homes in 2004. Relationship between practice scores and appreciation levels significant at .10 level.
Source: Harvard Builder Study, Division Survey.

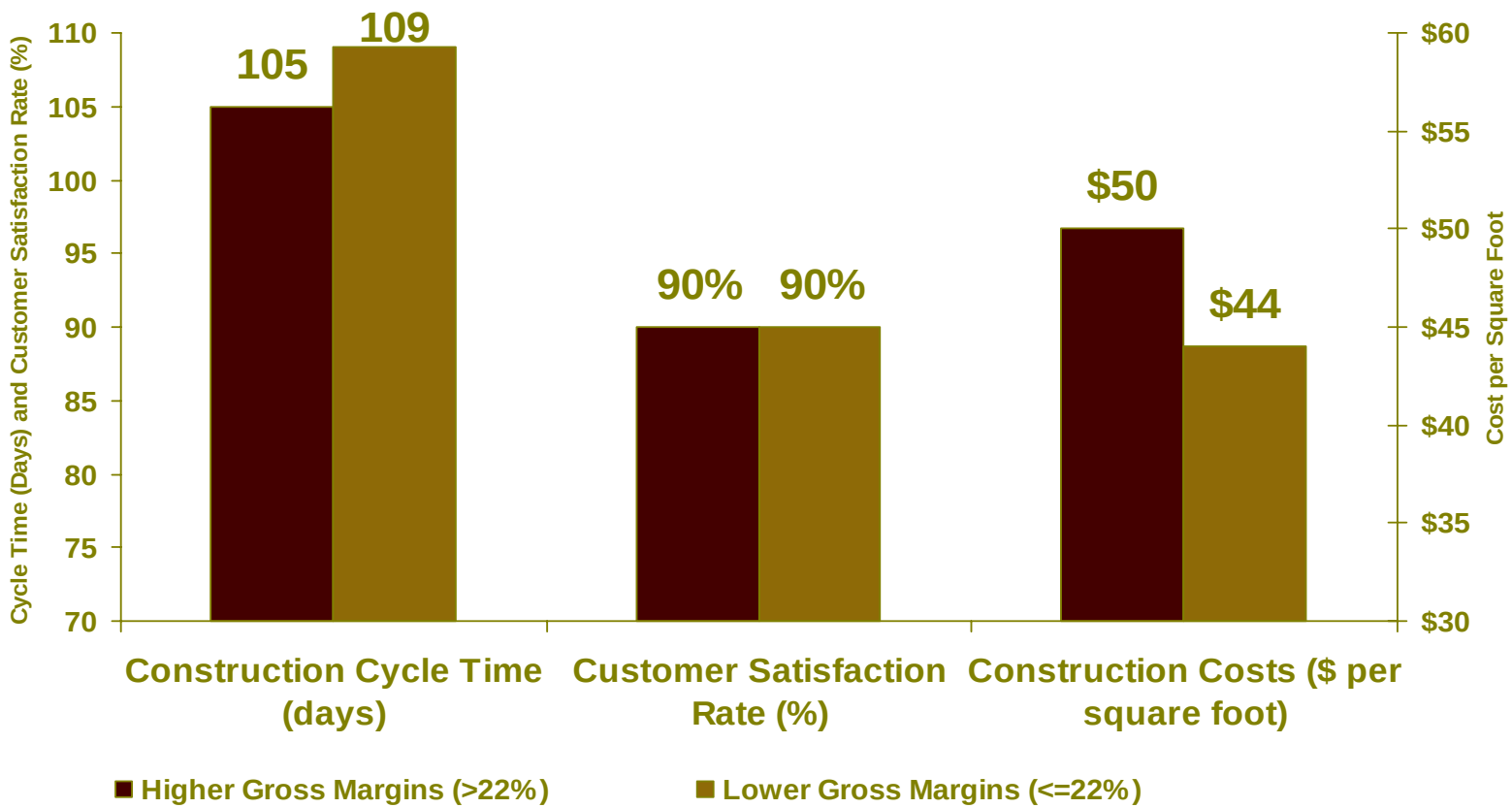
For Most Types of Information Sharing, Builders in Low Appreciation Markets More Likely to Share

	Low Appreciation Markets %	High Appreciation Markets %	All Markets %
Generally share planned building activity	75%	64%	70%
Share plans with ALL suppliers	56%	41%	50%
Subs and installers have access to schedule	70%	50%	61%

Note: Differences are not significant at the .05 level.
Source: Harvard Builder Study, Division Survey.

Performance: More Profitable Builders Do Not Generally Perform Better on Key Operational Measures

Median responses across all builder divisions, 2004



Source: Harvard Builder Study, Division Survey.

Average Cost per Square Foot Attributed to Special Trades

Average among divisions

Division Size (Number of homes built in 2004)	**Lower Appreciation Markets**	**Higher Appreciation Markets**	**All Markets**
Small (<500)	13	16	14
Medium (500-999)	15	22	19
Large (1,000+)	19	24	22
All Divisions	16	22	19

Source: Harvard Builder Study, Division Survey.

Average Number of Days Spent on Special Trades

Average among divisions, 2004

Division Size (Number of homes built in 2004)	**Lower Appreciation Markets**	**Higher Appreciation Markets**	**All Markets**
Small (<500)	24.2	30.3	26.2
Medium (500-999)	32.8	47.9	39.8
Large (1,000+)	36.4	42.0	38.5
All Divisions	31.7	42.4	36.1

Note: Special trades include foundation, framing, finishing, electrical, plumbing and masonry. Matched observations.

Source: Harvard Builder Study, Division Survey.

Builder Divisions in Low House Price Appreciation Markets Have Lower Cycle Times & Construction Costs

Averages across divisions for entry-level homes built in 2004

	Lower Appreciation Markets	Higher Appreciation Markets	All Markets
Construction Cycle Time (days)	107	112	108
Cost of Construction per Square Foot	$48	$58	$51

Notes: Construction costs exclude basement, slab and land. Differences in construction costs between lower appreciation and higher appreciation markets significant at 0.15 level; differences in cycle time not statistically significant.
Source: Harvard Builder Study, Division Survey.

CONCLUSION: Little evidence that major homebuilders translated scale into operations:

- Changes in how homebuilders deal with subcontractors in terms of bidding of work, management of construction at the job site, purchase of materials by subcontractors or overall construction coordination;
- Greater investment in the new generation of information technology that became available in the 1990s;
- Improved buying power to reduce prices charged by suppliers or improve the service they provide builders at the job site;
- Removing supply chain redundancies or streamlining the processes of planning, acquiring, and transporting building supplies to the job site.

The importance of markets in driving operational improvements

- Price appreciation—and the market conditions that produce them—is a far better predictor of which homebuilders improved practice and performance and which did not.
- During the period from 1990 to 2005, major builders became national organizations. As they grew, merged, and often went public, their day-to-day operational features remained very local and decentralized.
- Innovations driven more at the local level, where homebuilders faced the greatest incentives to address the operational side of their income statements.

Conclusions and implications

- Major opportunities exist for significant improvement in operations:
  - Managing consumers, contractors, distributors, and suppliers, via information technology
  - Improving coordination of networks of subcontractors given construction management model
  - Increasing the benefits from scale production and new procedures of construction technology
  - Moving towards 21st Century logistics practices (or even late 20th Century ones!)
  - Synergies in the above to improve risk management in the production of housing.

Conclusions and implications

- Given the steep decline in the U.S. housing market and with prospects for only a long term and gradual recovery, the time has never been more important to fully understand what happened during the past boom

Figure A-1: Survey Coverage – Over 60% of Homes Built by Larger Builders in 2004

Builder Size (Number of homes built in 2004)	**No. builders (U.S. totals)**	**Sample size**	**No. respond.**	**Response rate**	**Respond. share of total U.S. closings in category**
Large national (10,000+)	10	10	8	80.0%	77.4%
National (2,500–9,999)	24	24	14	58.3%	69.8%
Multi-regional (1,000-2,499)	46	22	8	36.4%	18.2%
Regional (500-999)	61	22	11	50.0%	16.7%
All builders closing 500 or more units	141	78	41	52.6%	61.2%

Source: Harvard Builder Study, Corporate Survey.

Figure A-2: Survey Coverage – Often Multiple Divisions per Builder

Builder Size (Number of homes built in 2004)	No. Builders Reporting	No. Divisions Reporting	Avg. Reporting Divisions/ Builder
Large national (10,000+)	8	35	4.4
National (2,500–9,999)	14	27	1.9
Multi-regional (1,000-2,499)	8	13	1.6
Regional (500-999)	11	13	1.2
All builders closing 500 or more units	41	88	2.1

Source: Harvard Builder Study; Builder Corporate and Divisional Surveys.