

Evolutionary Trends Shaping the Future Of Quantitative Investment Management

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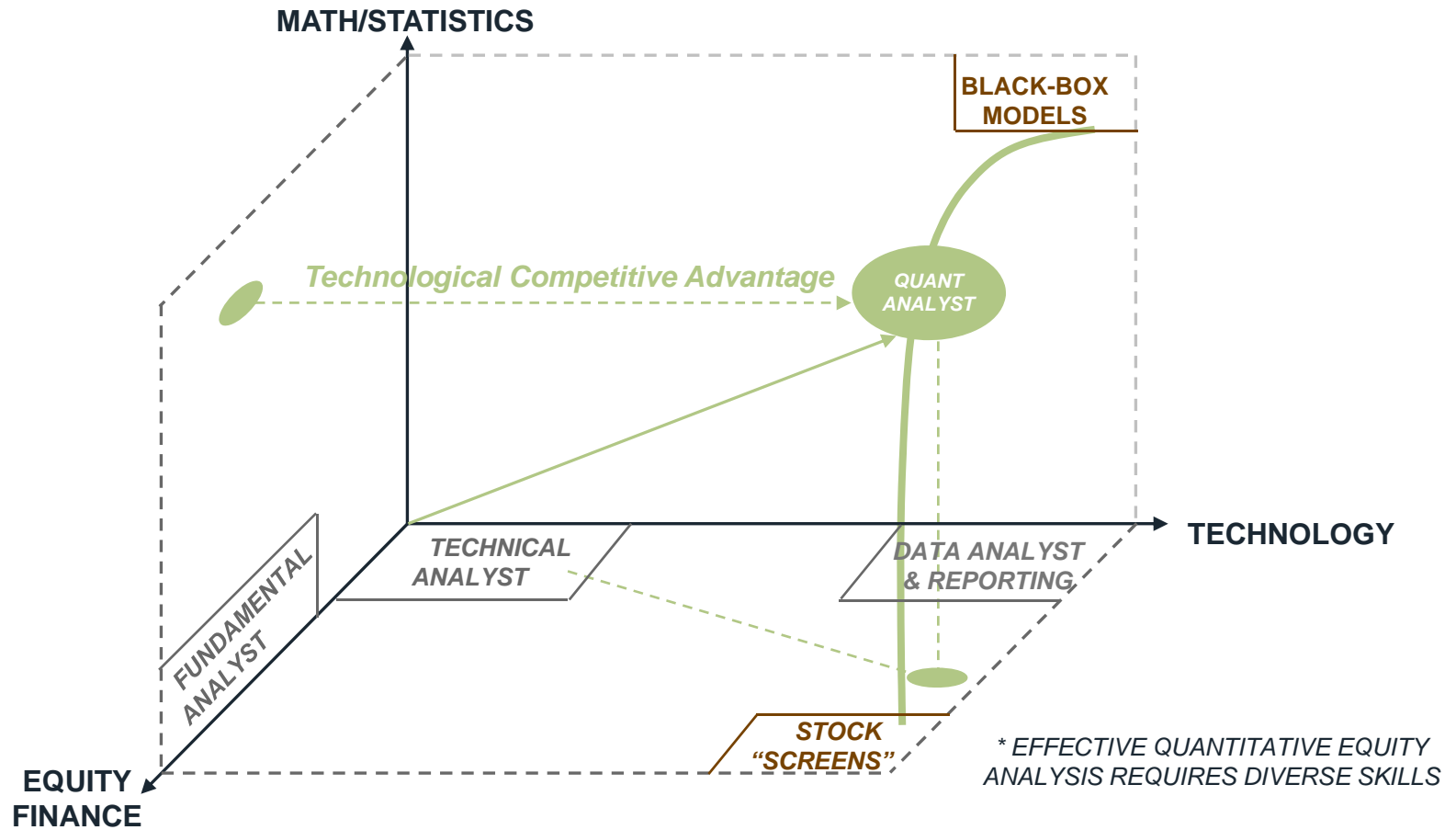
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Agenda

- Quantitative investing defined
- Adoption of quant investing
- Progression of quant products
- Intersection investing: Learning to embrace the “enemy”
- State of the quant world today

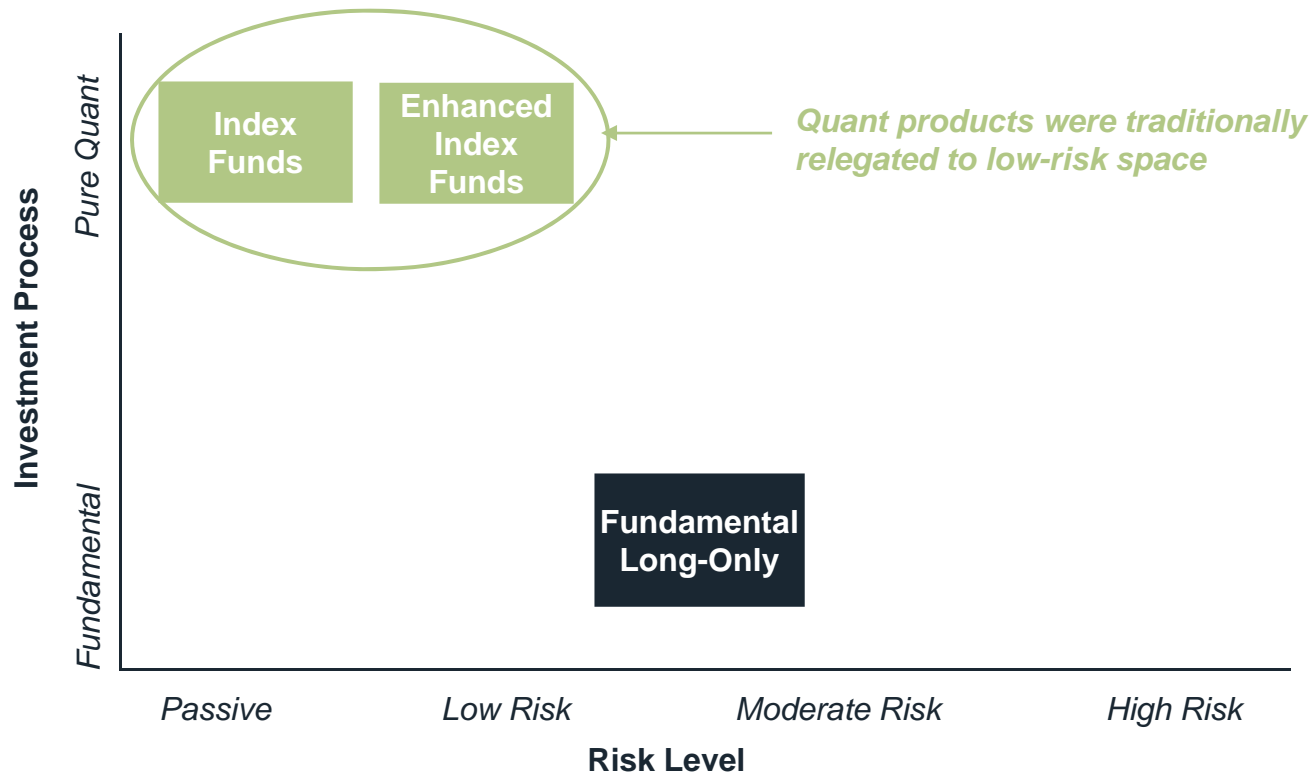
Will the real “quant” please stand up?



EQUITY QUANT = FINANCE + MATH + TECHNOLOGY

Source: Pyramis Global Advisors 2008

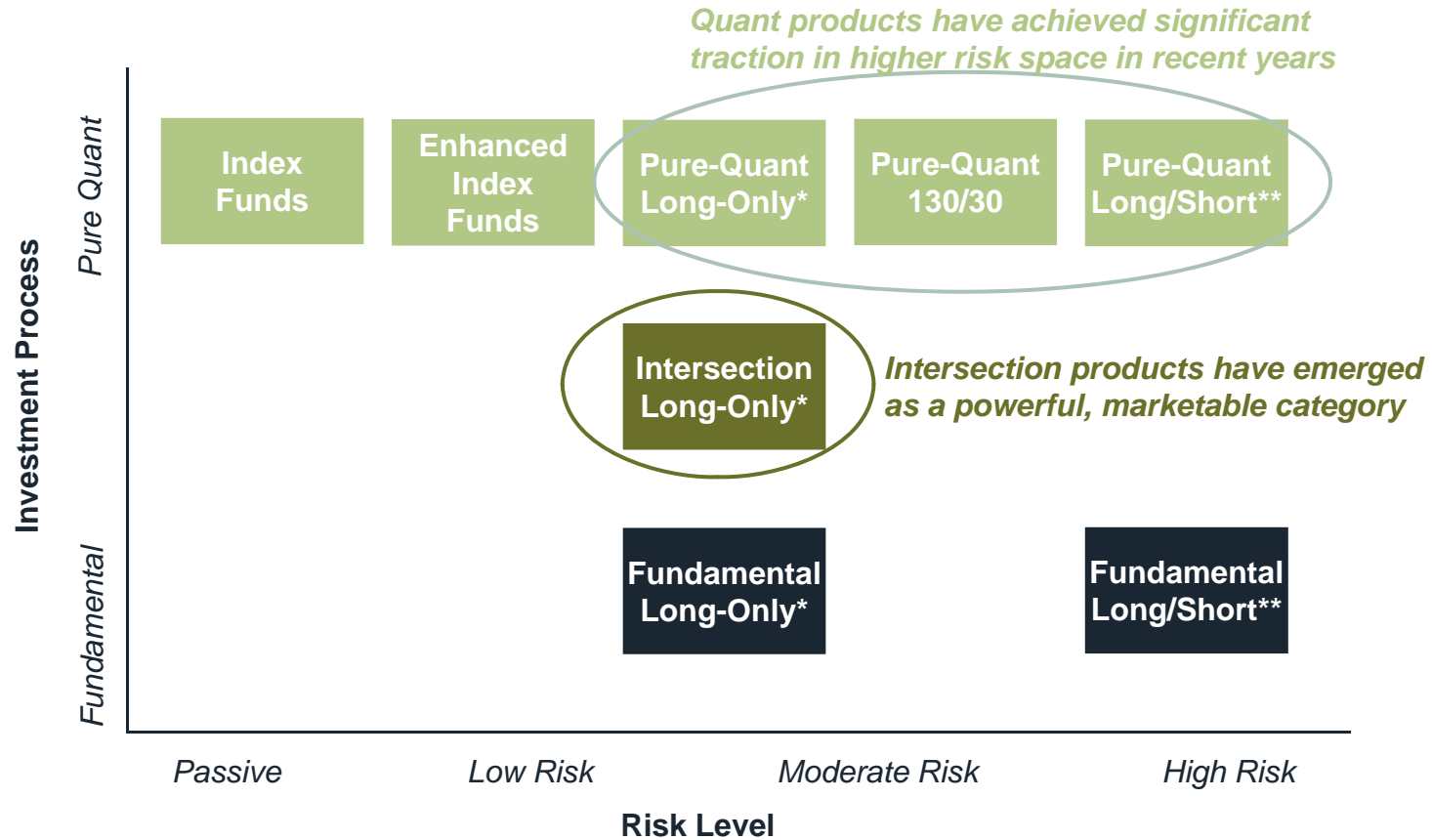
Industry product offerings: Traditional



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Trends in Quantitative Asset Management

Industry product offerings: Current

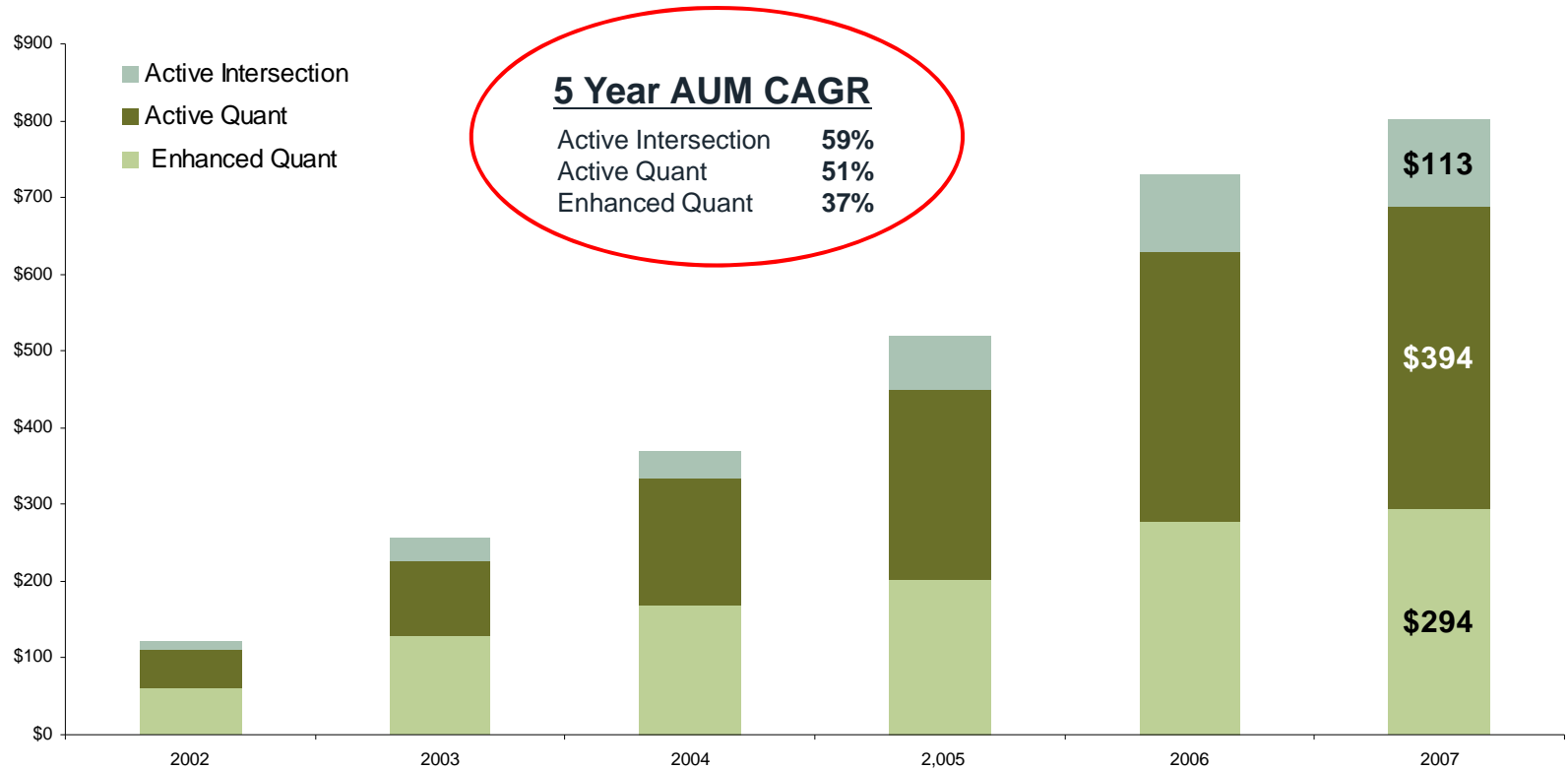


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* Current Pyramis Products
 ** Pyramis Under-Development

Market adoption of quant strategies

Institutional Quant AUM Growth 14 Representative Institutional Firms (2002 - 2007)



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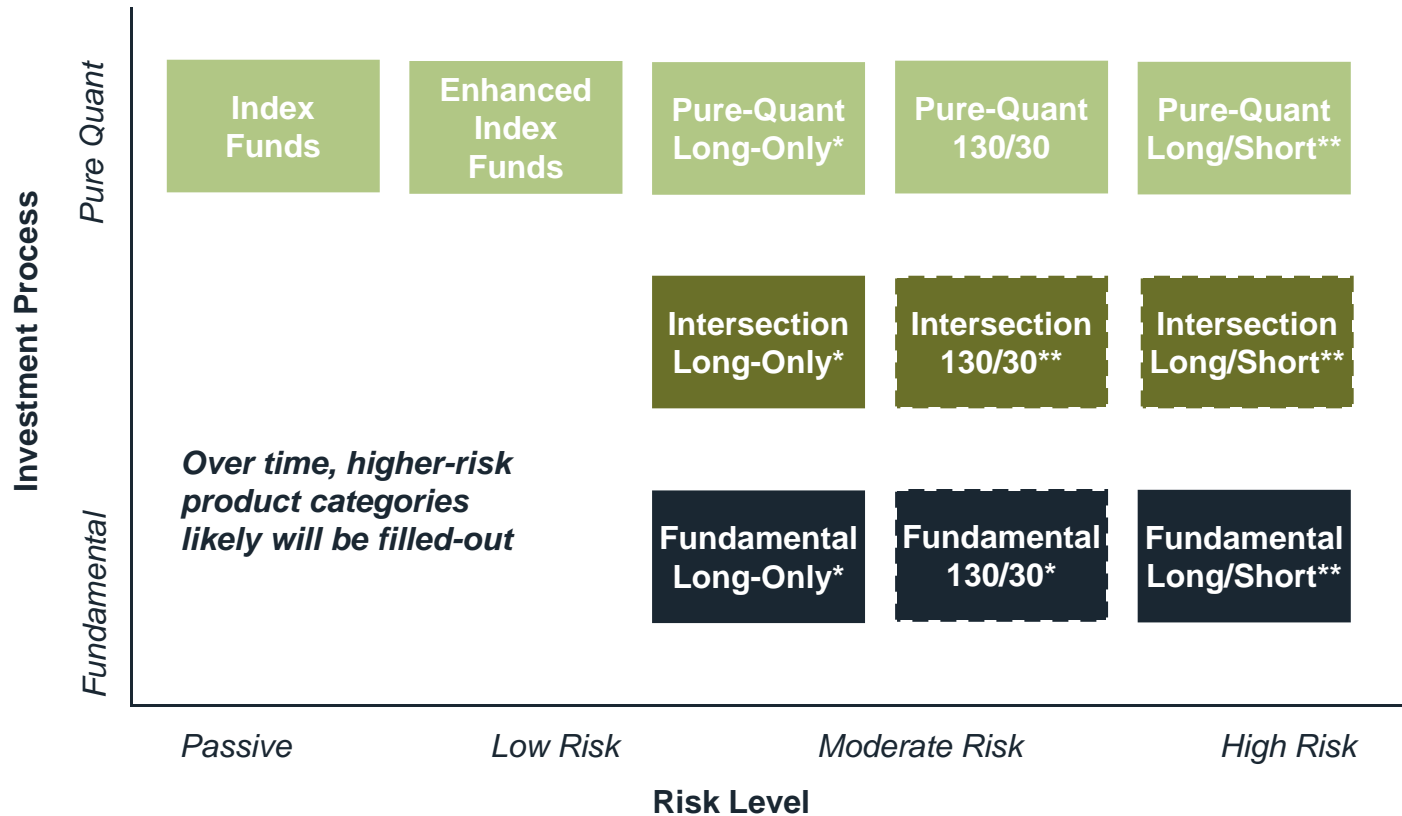
Source: Pyramis Global Advisors 2008

Drivers behind quant adoption

- “Graduation” of quants from risk-controlled (enhanced index) roles into alpha (active management) roles
- Low-cost investment platform
- Hedge fund adoption of quant investing
- Technological advances in industry analytical software (outsourcing of technology infrastructure)
- Commoditization of vast amounts of data
- Blurring of lines between academics & practitioners
- Field-proven performance
 - Casey Quirk Study: “The Geeks Shall Inherit the Earth” (November 2005)
 - Active U.S. Large-Cap Quant Strategies (2001-2004): 5.6% annualized (2.7% Track Error)
 - Active U.S. Large-Cap Fundamental Strategies: 4.5% annualized (4.5% Track Error)

Source: Casey Quirk Associates, “The Geeks Shall Inherit the Earth” November 2005

Industry product offerings: Future



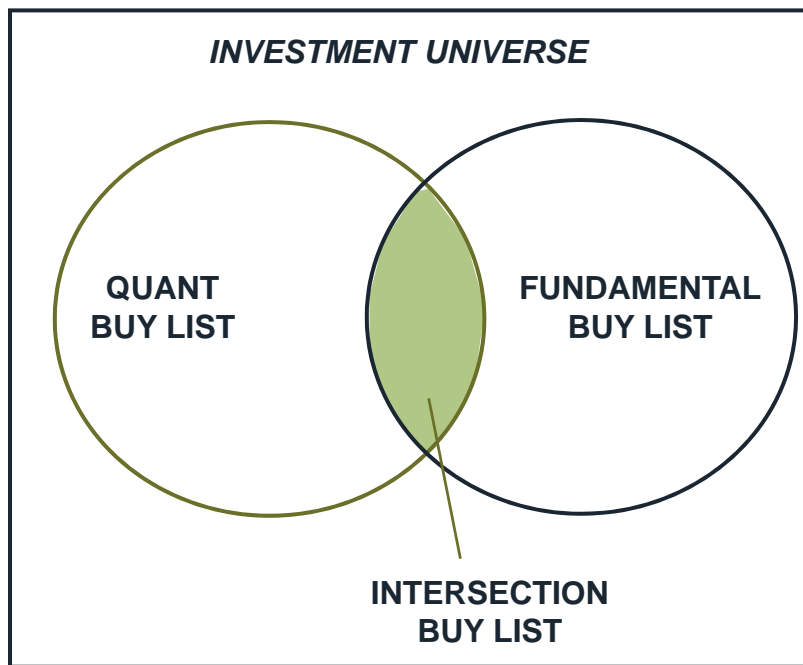
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Intersection Investment Models

What is an intersection product?

*** Intersection portfolios are constructed using stocks that are both quantitatively as well as fundamentally attractive**



Four Common Intersection Investment Approaches:

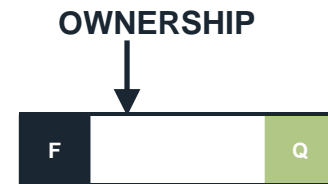
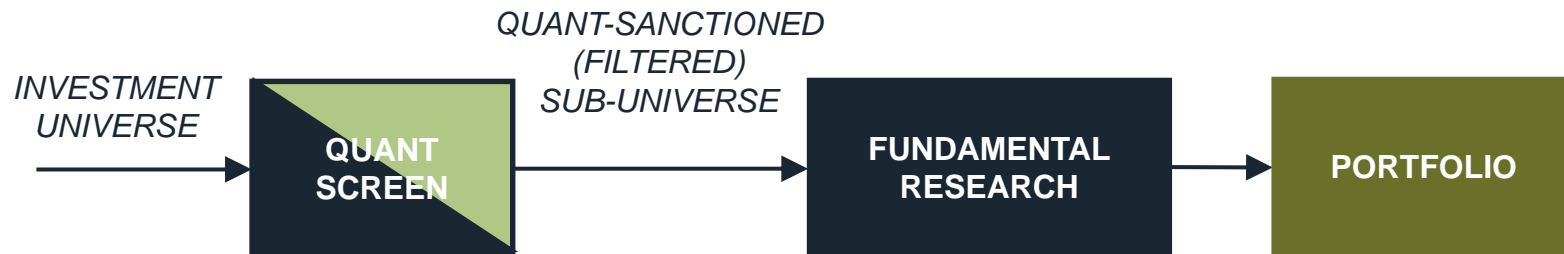
- Quant Screen Model
- Quant Hurdle Model
- Fundamental Screen Model
- Blended Model

$$\alpha_{\text{INTERSECTION}} = \alpha_{\text{QUANT}} + \alpha_{\text{FUNDAMENTAL}} \text{ (Theoretical)}$$

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Source: Pyramis Global Advisors 2008

“Quant Screen” intersection model

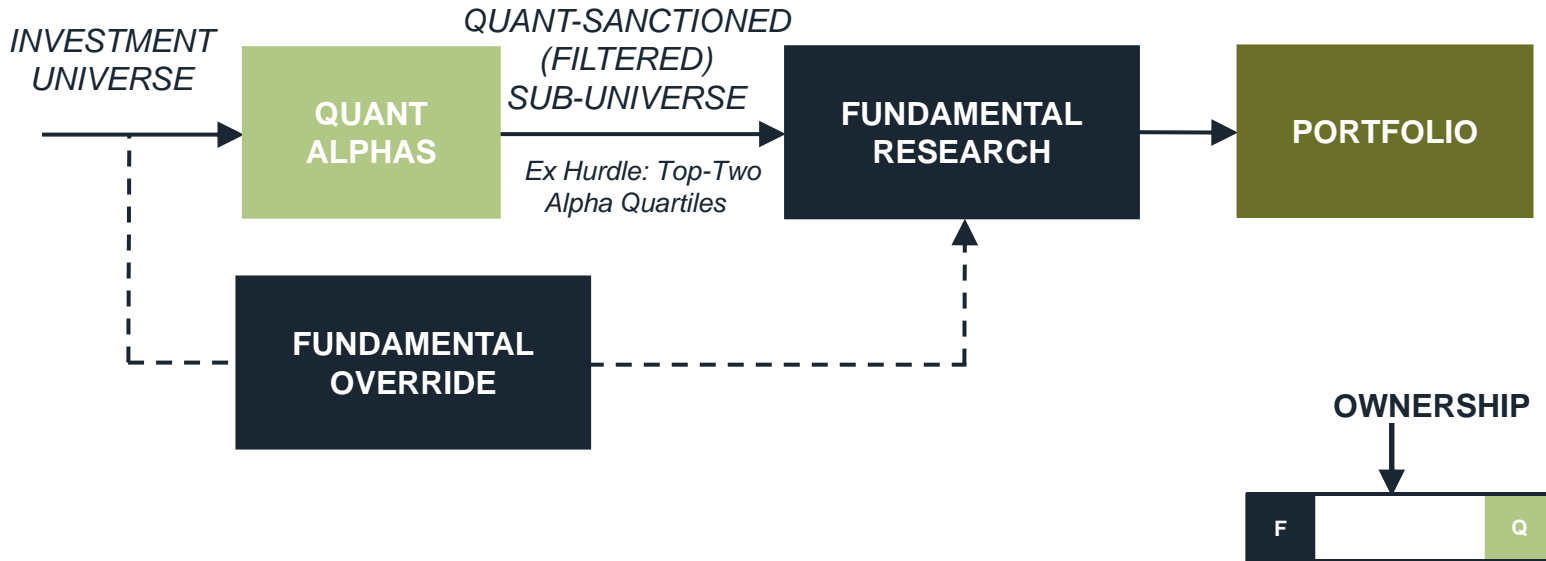


Characteristics:

- Easy transition for a fundamental organization
- Facilitates efficiency of fundamental research
- Limited influence of quantitative research
- Two distinct teams
- Product largely owned by fundamental team

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“Quant Hurdle” intersection model

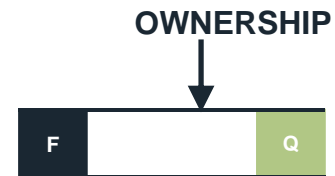
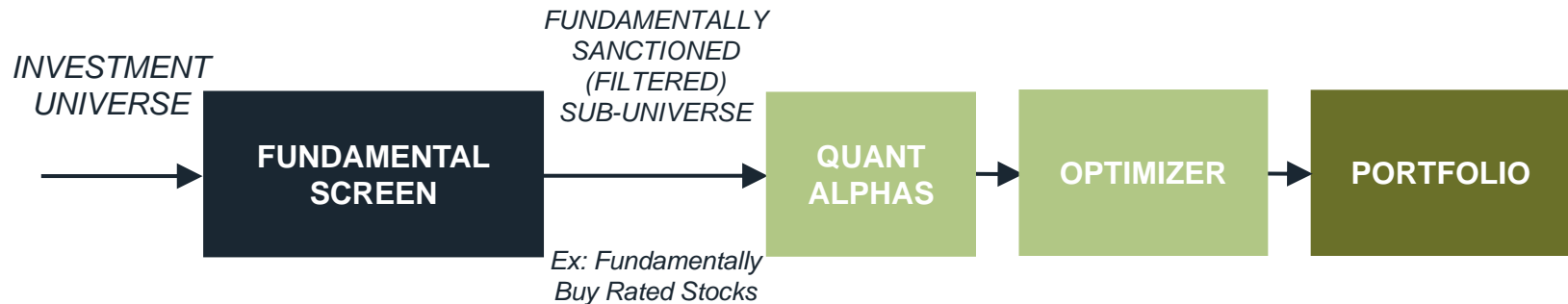


Characteristics:

- Accommodates advanced, independent quant approaches (i.e., multi-factor alpha platforms vs. quant screens)
- Potential to help avoid product style drift
- Elevated recognition/usage of quant talent
- Distinct teams with balanced product ownership
- More difficult transition for fundamental organizations

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“Fundamental Screen” intersection model

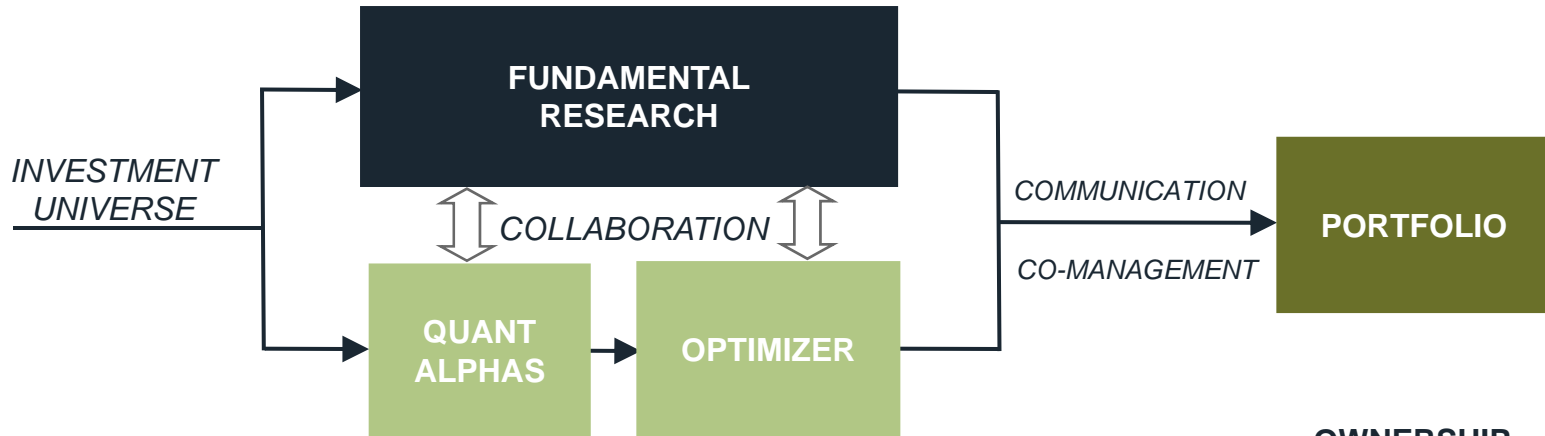


Characteristics:

- Requires sophisticated, independent quant team
- Very disciplined investment approach
- Product largely owned by quantitative team
- Less common product model in practice
- Pyramis has several such product offerings

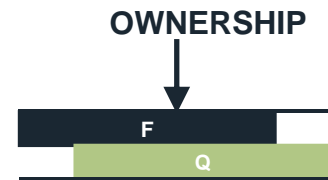
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“Blended” intersection model



Characteristics:

- Balanced ownership
- Two teams with significant knowledge overlap (ideally single team of multi-conversant members)
- Very difficult to achieve in practice (communication, collaboration, conversancy, skill-sets)
- Purist and most powerful form of intersection investing
- Significant performance potential



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State of Quant Investing 2007–2008

The quant world today: Soul searching

- Are we in a brave new world?
 - Experiential modeling (historians)
 - Judgmental modeling
- Why now?
 - Optimistic view: “Rare” events do happen
 - Pessimistic view: Victims of our own success (too many quants)
- How much money is managed quantitatively?
- Was embedded risk not properly quantified and, if so, why?

Are all quants alike?



- Outsourcing of software tools (backtesting, optimization)
- Proliferation of external vendor databases
- Lower barriers to entry
- “Bolt-on” quant efforts
- Recent sell-side studies

⇒ **Too much financial engineering?**

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Lessons: What should quants do differently?

■ Need better risk models and techniques

- Most risk models are “normal” in nature
- Need to better address “tails” of return distribution to better model infrequent events, shocks
 - ⇒ Example: Extreme Value Theory (EVT)
- Traditionally, only recent market is used to model risk (slowly time-varying)

■ Need to better diversify our alpha models

- Need expertise beyond traditional value and momentum factors
- Elevate pursuit of new proprietary, independent factors and novel information sources
 - ⇒ Example: Text parsing, etc.
- Expand into areas traditionally dominated by fundamental analysts
- Cultivate non-traditional modeling techniques (non-linear, time-varying)

■ Need to monitor behavior: alpha factors, risk models, factor correlations

■ Need to better acknowledge and communicate with clients about quantitative investment techniques and risk controls

Lessons: What should investors, sponsors do differently?

- Ask questions about the quantitative modeling process
 - How proprietary is the development process (uniqueness vs outsourcing)?
 - How does the modeling effort avoid excessive data-mining and over-fitting?
 - Sophistication about realistic modeling effects (transaction costs, liquidity, capacity, etc.)
- Ask questions about the quantitative investment process
 - Performance attribution architecture
 - Alpha model monitoring and process policies
 - Client communication on quant performance, insights, adjustments
- Look closely at the underlying quant effort
 - Qualifications / background of team members (experience, diversity, uniqueness)
 - Details on infrastructure (software tools, statistical techniques, data sources)
 - Organizational support (sufficient mass, specialization, IT support, visibility/recognition)
 - Quantitative AUM (indicates corporate commitment to a quant-driven agenda)

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