Uncovering the Price of Growth and Value

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Takeaways

- Presenting the decomposition approach for boosting the explanatory power of empirical studies towards developing explicit theoretical models
- Uncovering the momentum effect as the sampling of high volatility growth stocks
- Explaining the variation of fundamental-to-price metrics across roughly 75% of big stocks with a single GPOA feature and $R^2 \sim 45\%$
- Shedding light on the HML factor redundancy question (Fama and French, 2015) by explaining it as a sampling of stocks based on their quality features

Talk Outline

Big Picture

Developing the Explanatory Gain Decomposition Approach within the Momentum Study

Uncovering the Price of Growth and Value

Shedding Light on the Redundancy of the HML Factor

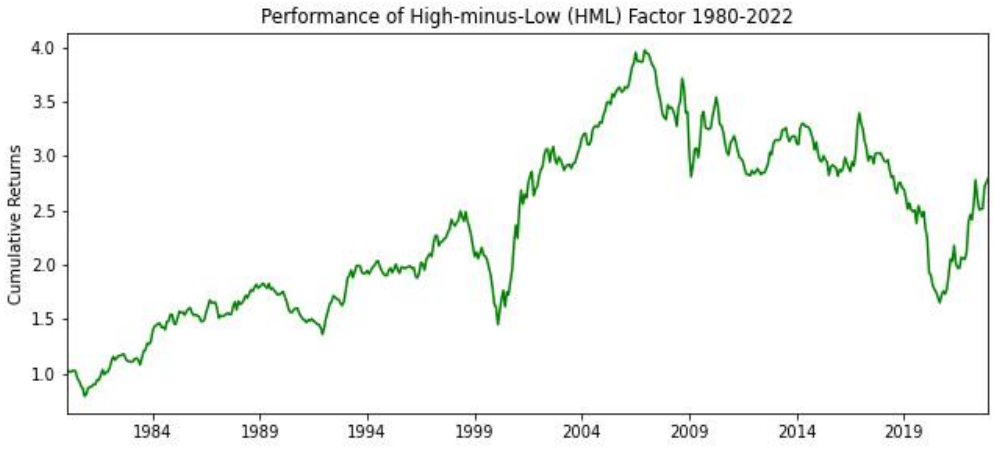
Concluding Remarks

Big Picture

Value Investing as a Long-Term Challenge

1934: Graham and Dodd presented the concept of firm intrinsic value and proposed a double condition stock screening approach

1993: Fama and French captured performance difference between high (Value) and low (Growth) book-to-market portfolios as high-minus-low (HML) factor

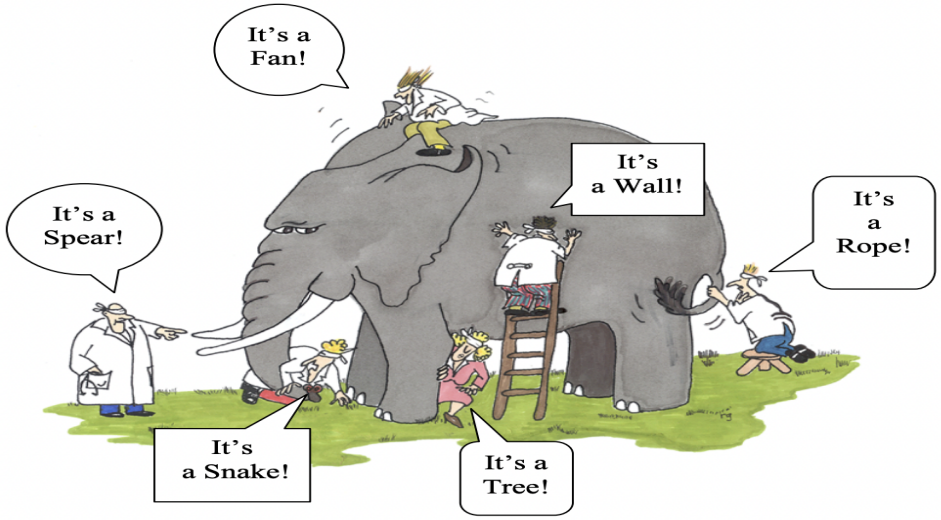


2007: Performance switch triggered a new round of discussions on understanding HML (Arnott et al., 2021; Blitz and Hanauer, 2021; Israel et al., 2021; Stagnol et al., 2021; Lev and Srivastava, 2022)

2023: Challenge remains unsolved

Conceptual Problem and Question

- Empirical studies exhibit low explanatory power as, for example, demonstrated by the zoo of factors (Cochrane, 2011; Harvey and Liu, 2019)
- Multiple models aim to explain the results of these empirical studies

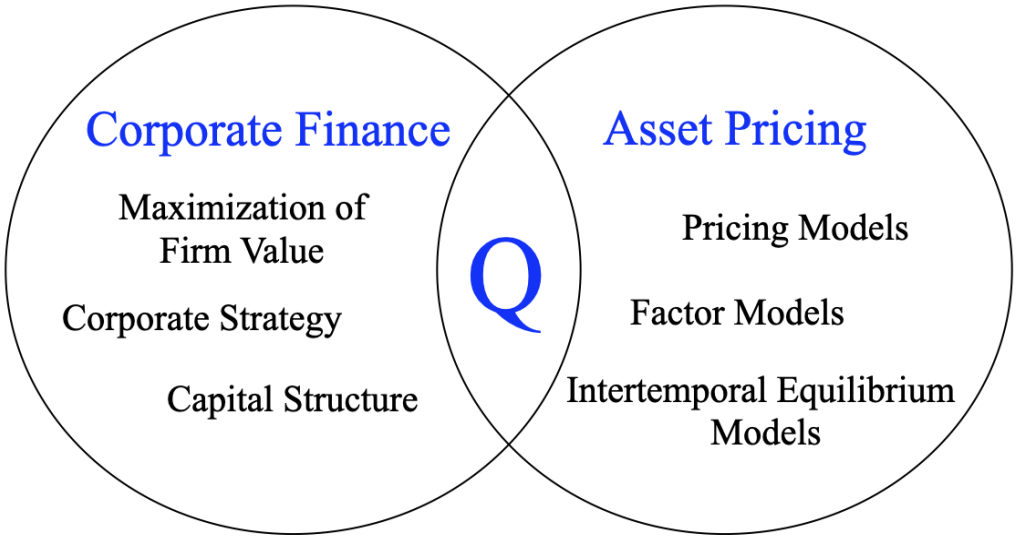


Source: Himmelfarb et al., 2002 (artist: G. Renee Guzlas)

Question: Will the challenge be solved before or after 2034 (century anniversary)?

Decomposition as a Conceptual Solution

- Growth and value stock performances are determined by a dynamic composition of multiple related effects
- This project proposes to complement previous coarse-grain all-in regressions with a finer-grained decomposition approach towards developing explicit theoretical models



The first step on this path (Today's Talk): explaining fundamental-to-price ratios (B/P and Q) via firm characteristics

Developing the Explanatory Gain Decomposition Approach within the Momentum Study

Uncovering Momentum - 1 of 2

Background: Jegadeesh and Titman (1993) documented the momentum effect

Multi-Step Decomposition Approach (Malitskaia, 2020):

- Dissecting the momentum performance along bull/bear states and winners/losers deciles
- Identifying the unscaled momentum decile as a basic common block across conventional and time-series strategies
- Dividing momentum deciles into portfolios based on fundamental and technical characteristics
- Applying rolling event-oriented analysis across ranking, transition, and holding intervals

Result[1]: Transparently explained the source of 2010-2019 momentum premium as sampling of high volatility growth stocks (leaving no room for behavioral models)

[1] Presented at SIAM FM'21 as the talk "Uncovering Momentum with Intertemporal Analysis".

Uncovering Momentum - 2 of 2

Explaining Momentum Effect based on Intertemporal Analysis

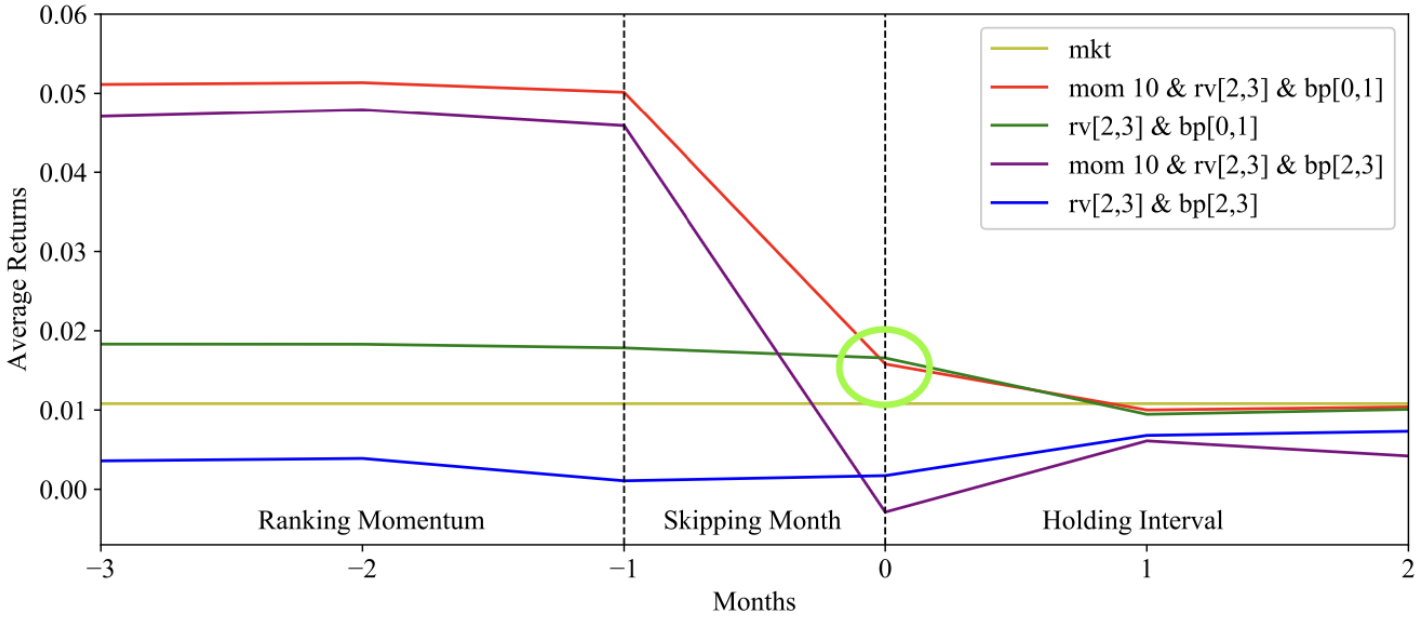


Figure: Traces and compares the high volatility (rv(2,3)) growth (bp(0,1)) and value (bp(2,3)) bivariate quartiles performance within the momentum winners (mom10) decile and full sample

- During the skip interval at lag month -1, momentum winners coincide with the mean level of high volatility growth stocks from the full sample. After the formation date, they both experience a similar short-term reversal

Uncovering the Price of Growth and Value

First Step (Today's Talk) Research Question

In theory, the fundamental-to-price ratio can be estimated from one of the variations of net present value models, for example, the residual income model (Ohlson, 1990):

$$\underbrace{V_t}_{\substack{\text{firm}\\ \text{value}}} = \underbrace{B_t}_{\substack{\text{capital}\\ \text{in place}}} + \underbrace{\sum_{s=0}^{\infty} \frac{RI_{t+s}}{(1+\rho_{t+s})^s}}_{\substack{\text{growth}\\ \text{opportunities}}} \tag{1}$$

Within empirical studies, one of the latest explicit valuation models was proposed by Asness et al. (2019) using a single composite score *Quality*:

$$log(M/B)_t^i = a + bQuality_t^i + controls + \varepsilon_t^i \tag{2}$$
$$Quality = z(Profitability + Growth + Safety)$$

The *Quality* variable however (without controls and fixed effects) explained only 9% of the cross-sectional variation in M/B.

RQ: Is the decomposition approach able to boost the explanatory power of the existing empirical studies towards the development of explicit models?

Decomposing the Valuation of Growth and Value

- Dividing the HML factor into the Big and Small HML subfactors and consequently into Big Growth and Value portfolios
- Dividing the composite quality score proposed by Asness et al. (2019) and individually assessing the predictive abilities of its constituent features together with other characteristics (Fama and French, 2015)
- Comparing the predictive abilities of the alternative LHS variables, such as book-to-market and Tobin's Q ratios
- Analyzing the structure dynamics of the of Big Growth and Value portfolios via GPOA-based deciles (selected in the previous steps)

Feature Importance Analysis

Selection of quality-related features was based on two methods: linear regression and mean decrease impurity (MDI) method in tree regression approach

Dependent Variable: Tobin's Q Deciles							
	Linear Regressions						MDI
	(1)	(2)	(3)	(4)	(5)	(6)	
GPOA	0.68***					0.51***	0.602
	(171.9)					(100.4)	
ROA		0.60***				0.21***	0.256
		(135.9)				(29.5)	
ROE			0.43***			0.01**	0.029
			(88.2)			(2.5)	
GMAR				0.28***		0.05***	0.047
				(54.1)		(15.2)	
ΔAT/AT					0.28***	0.20***	0.066
					(54.12)	(52.7)	
Constant	1.96***	2.11***	3.12***	4.19***	4.17***	0.09***	
	(79.8)	(72.3)	(95.8)	(131.6)	(130.3)	(2.61)	
Adj. R^2	0.45	0.32	0.19	0.07	0.13	0.53	

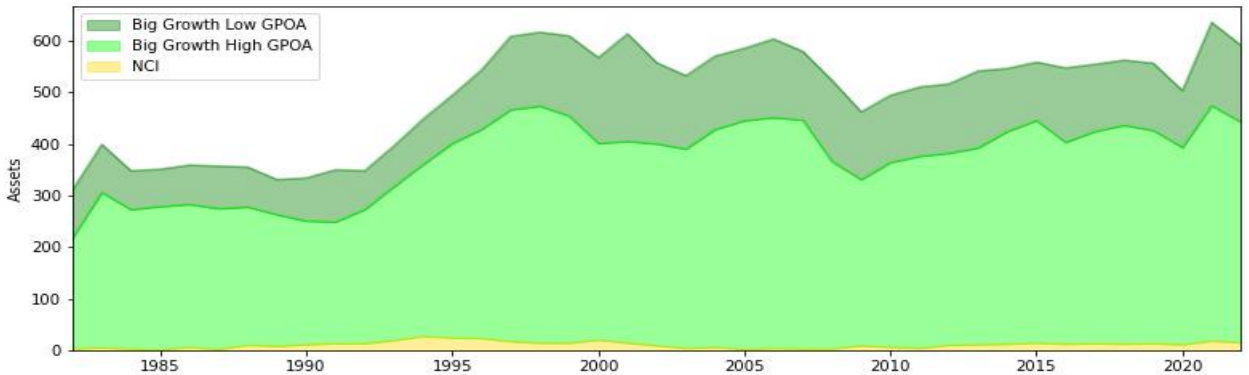
Table: Relationship between Tobin's Q Deciles and Quality Characteristics Deciles

- Gross profits over assets (GPOA) is the most important quality feature. This is consistent with Novy-Marx (2013) that gross profit represents "the cleanest accounting measure of the true economic profitability"

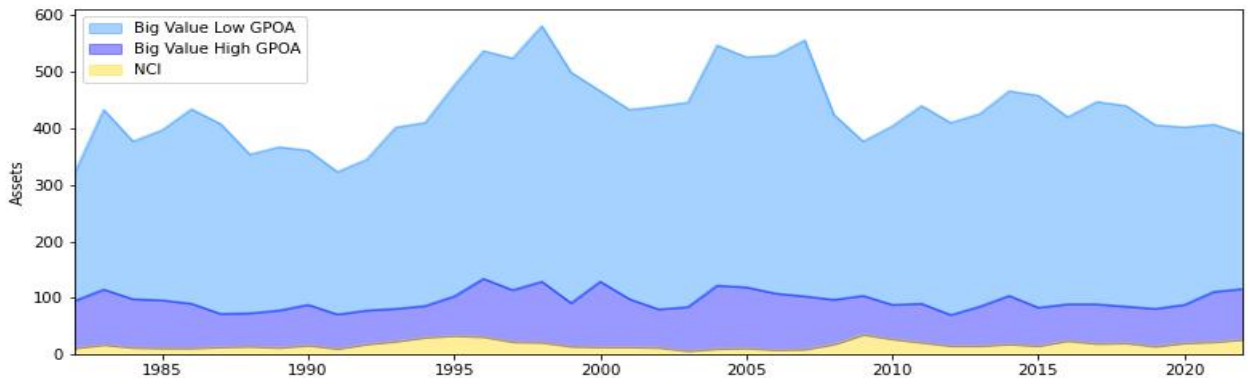
GPOA-Based Structure of Q Growth and Value

Temporal Analysis

The figures decompose the structure of Big Growth and Big Value into two groups of High and Low GPOA stocks



(a) Big Growth (High Tobin's Q Rank) Portfolio



(b) Big Value (Low Tobin's Q Ranks) Portfolio

- Big Growth are mostly formed from stocks with a high GPOA rank while the high book-to-market (value) portfolio is mostly composed of low GPOA stocks.
- Portfolio composition remains relatively stable through entire interval

Shedding Light on the HML Factor Redundancy Question

Redundancy of HML Factor

Five Factor Model (Fama and French, 2015):

$$R_{it} - R_{Ft} = ai + b_i(R_{Mt} - RF_t) + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + e_i$$

- "... our results suggest that HML is a redundant factor ... our tests suggest that a four-factor model that drops HML performs as well as the five-factor model." (Fama and French, 2015)

- "So, should we all stop worrying about, and writing long papers about, say, the facts and fictions related to value investing, instead concentrating on only the other four factors? ... We argue no." (Asness et al., 2015)

Explanation (this paper):

Here the price-to-accounting ratio is considered as another category of quality features determined by the market. As shown in the previous slides, they can be estimated via accounting-based measures:

price-to-accounting (quality) ratio $\sim$ accounting-based (quality) measures

Performance of HML Growth and Value Components vs their GPOA-based Partitions

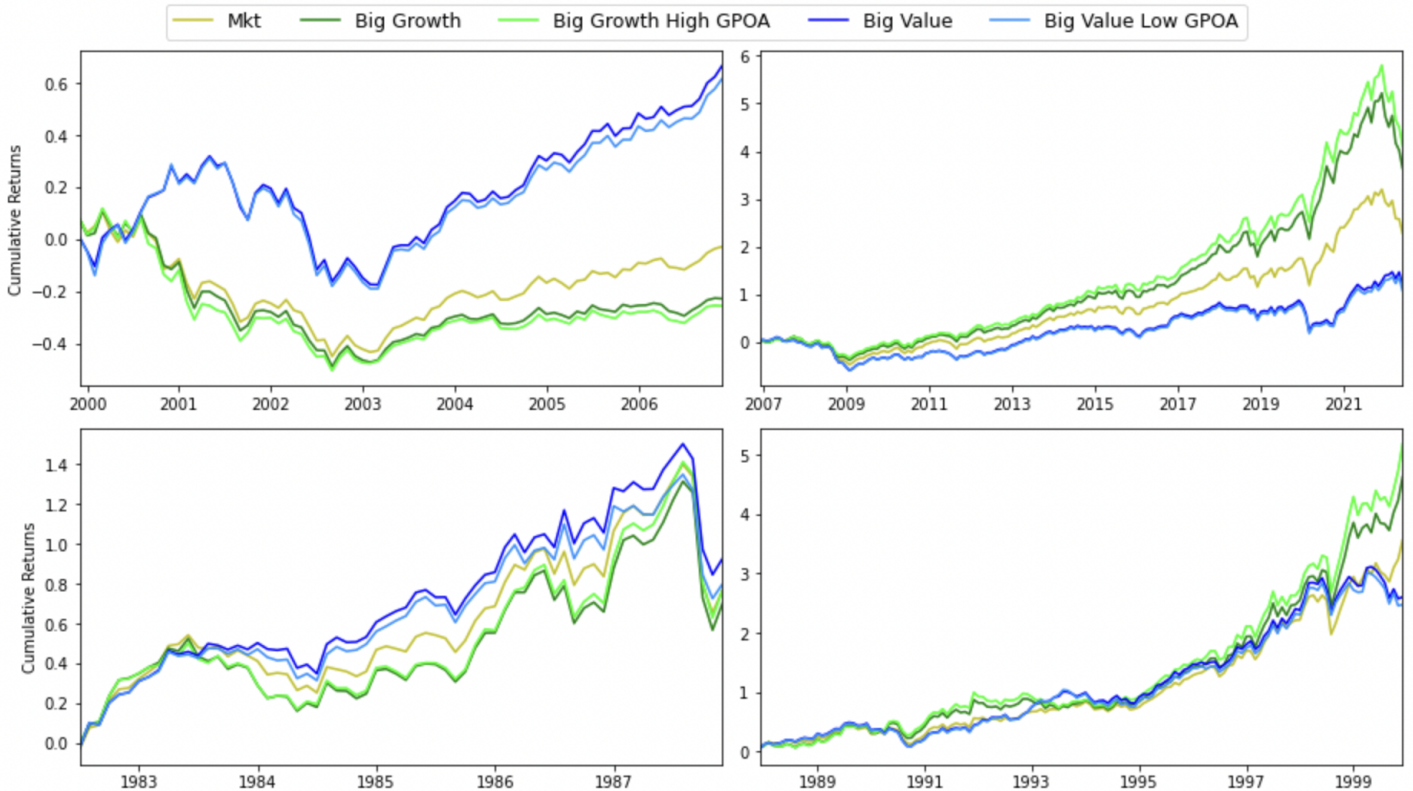


Figure: Performance comparison between the Big Growth and Big Growth High GPOA portfolios and the Big Value and Big Value Low GPOA portfolios based on cumulative returns over the past forty years.

- Plots confirm the description of the Big HML portfolio structure based on the GPOA characteristic. Furthermore, the discrepancy between these portfolios and their GPOA-based partitions identifies the level of contribution from other assets

Concluding Remarks

Contributions (Closing the Loop of the Talk)

- Presenting the decomposition approach for boosting the explanatory power of empirical studies towards developing explicit theoretical models
- Uncovering the momentum effect as the sampling of high volatility growth stocks
- Explaining the variation of fundamental-to-price metrics across roughly 75% of big stocks with a single GPOA feature and $R^2 \sim 45\%$
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References I

Arnott, R., Harvey, C., Kalesnik, V., and Linnainmaa, J. (2021). Reports of Value's Death May Be Greatly Exaggerated. *Financial Analysts Journal*, 77(1):44–67.

Asness, C., Frazzini, A., and Pedersen, L. (2019). Quality Minus Junk. *Review of Accounting Studies*, 47(2):34–112.

Asness, C., Frazzini, A., Ronen, I., and Moskowitz, T. (2015). Fact, Fiction, and Value Investing. *The Journal of Portfolio Management*, 42(1).

Blitz, D. and Hanauer, M. (2021). Resurrecting the Value Premium. *The Journal of Portfolio Management*, 47(2):63–81.

Cochrane, J. (2011). Presidential Address: Discount Rates. *The Journal of Finance*, 66(4): 1047-1108.

Fama, E. and French, K. (1993). Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics*, 33(1):3–56.

Fama, E. and French, K. (2015). A Five-Factor Asset Pricing Model. *Journal of Financial Economics*, 116(1):1–22.

Graham, B. and Dodd, D. (1934). *Security Analysis*. McGraw Hill.

Harvey, C. and Liu, Y. (2019). A Census of the Factor Zoo. Available at SSRN: https://papers.ssrn.com/abstract_id=3341728.

Jegadeesh, N. And Titman, S. (1993). Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *The Journal of Finance*, 48(1):65-91.

Lev, B. and Srivastava, A. (2022). Explaining the Recent Failure of Value Investing. *Critical Finance Review*, 11(2):333–60

Malitskaia, Y. (2020). Uncovering Momentum. Available at SSRN: https://ssrn.com/abstract=3502301.

Novy-Marx, R. (2013). The Other Side of Value: The Gross Profitability Premium. *Journal of Financial Economics*, 108(1):1–28.

Ohlson, J. (1990). A Synthesis of Security Valuation Theory and the Role of Dividends, Cash Flows, and Earnings. Contemporary Accounting Research, 6(2):648–76.

Stagnol, L., Lopez, C., Roncalli, T., and Taillardat, B. (2021). Understanding the Performance of the Equity Value Factor. Amundi Working Paper.