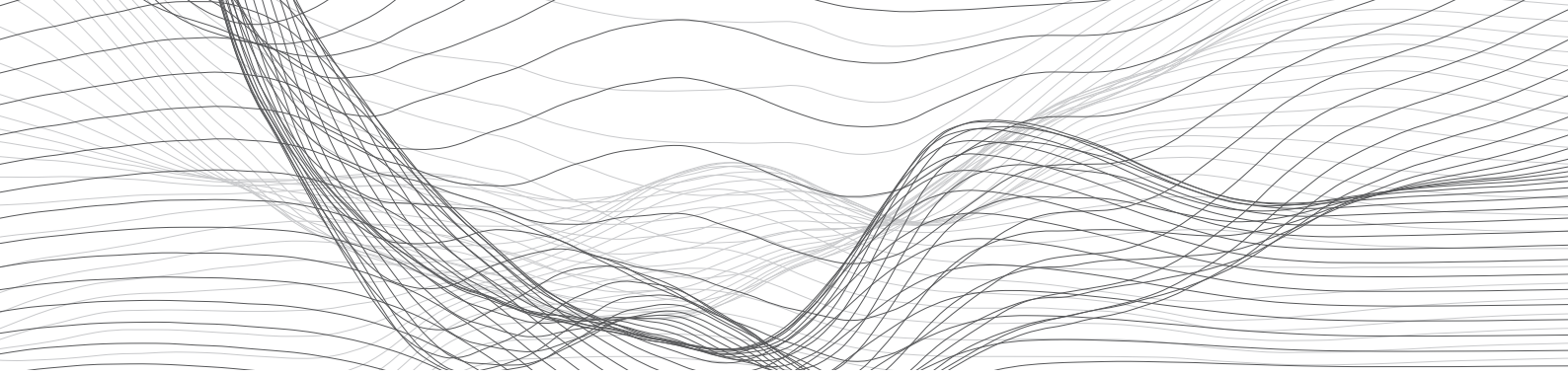

Did China's anti-corruption campaign affect the risk premium on stocks of global luxury goods firms?

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SNB Working Papers
9/2018

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SWISS NATIONAL BANK

Legal Issues

ISSN 1660-7716 (printed version)
ISSN 1660-7724 (online version)

Did China's anti-corruption campaign affect the risk premium on stocks of global luxury goods firms? *

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This draft: 2 July 2018.

Abstract

Media reports suggest that the recent Chinese anti-corruption campaign adversely influenced business prospects of globally operating luxury goods firms. This paper empirically tests this hypothesis. This paper finds that risk-adjusted returns on stock portfolios consisting of luxury goods firms with high exposure to China shifted persistently downward around the launch of the anti-corruption campaign. Risk-adjusted returns tend to co-vary with the intensity of the campaign. The evidence suggests that the Chinese anti-corruption campaign constituted negative cash-flow news about the affected global luxury goods firms. These findings neither pertain to luxury goods firms with low exposure to China nor to firms from other industries.

*I thank an anonymous referee of the SNB working paper series, Gregor Bäuerle, Joscha Beckmann, Petra Gerlach, Christian Hepenstrick, Julio Robledo, Jörn Tenhofen and participants of the SNB Brown Bag Seminar, the VWL Kolloquium at the University of Bochum and the SSES 2018 conference (St Gallen) for the helpful comments and suggestions. The views, opinions, findings, and conclusions or recommendations expressed in this paper are strictly those of the author. They do not necessarily reflect the views of the Swiss National Bank. The Swiss National Bank does not take responsibility for any errors or omissions in, or for the correctness of, the information contained in this paper. Earlier versions circulated under the title "China's anti-corruption campaign and the risk premium on stocks of luxury goods firms".

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JEL: F68, G15, G18

KEYWORDS: asset pricing, financial markets, political risk

1 Introduction

Global luxury goods firms have come under increased media scrutiny in recent years because of the potential impact of the recent Chinese anti-corruption campaign on these firms' business prospects (e.g., Neue Zürcher Zeitung, 2015; The Economist, 2013, 2014a,b). Even monetary policymakers of small, open economies with non-negligible exports of luxury goods have paid attention to the potential link between the Chinese anti-corruption campaign and the economic outlook for firms producing luxury goods (NZZ am Sonntag, 2017).

Judged by the media coverage of the recently launched Chinese anti-corruption campaign, the announcement of this campaign and the subsequent steps to enforce the new anti-corruption rules signaled persistently lower expected earnings (and hence dividends) of luxury goods firms due to a persistent decline in demand for luxury goods from China. In other words, the introduction of the Chinese anti-corruption campaign constituted adverse cash-flow news for these firms, which should have had a persistent and negative effect on their current stock prices and hence their expected returns (Campbell, 1991; Campbell and Vuolteenaho, 2004).

This paper empirically assesses whether this hypothesis is reflected in the data. This assessment is a case study of the potential impact of a change in government policy (political risk) - the introduction of China's recent anti-corruption drive - on excess returns on stocks of the affected firms.

We already know that political risk is priced into stock returns. Pastor and Veronesi (2013) provide theory and evidence of a risk premium in stock returns associated with political uncertainty. This political risk is unrelated to economic risk. Moreover, Pastor and Veronesi (2012) find that policy

changes adversely affect stock prices on average. In their theoretical model, stock prices respond negatively to changes in government policy because the announcement of an unanticipated policy change increases uncertainty for firms and thus discount rates. Bloom (2009) highlights the macroeconomic implications of political uncertainty. Adverse political uncertainty shocks are associated with subsequent drops in aggregate investment and output in the US.

Against this background, the contribution of this paper to the literature is twofold. First, this paper assesses the international dimension of the Chinese anti-corruption campaign. This paper extends the scope of existing studies of the impact of the Chinese anti-corruption campaign on Chinese firms' corporate investment (Pan and Tian, 2017), on the corporate culture of Chinese firms (Griffin et al., 2016), on Chinese real estate and local government debt markets (Ang et al., 2016) and on the credit allocation of state-owned enterprises (SOEs) and Non-SOEs (Li et al., 2017). Second, this paper evaluates whether a change in government policy can have a persistent impact on stock returns. A priori, it is unclear whether the introduction of the anti-corruption campaign has been associated with persistent or temporary changes in luxury goods firms' stock returns. On the one hand, the launch of the anti-corruption campaign could be interpreted as an adverse shock to the expected profitability and thus the expected cash flows of luxury goods firms. Such negative cash-flow news has a persistent negative impact on stock returns (Campbell and Vuolteenaho, 2004). On the other hand, the anti-corruption campaign as such might have had no material impact on the business prospects of luxury goods firms. Nonetheless, the announcement of the campaign could have led to a temporary fall in stock returns of luxury goods firms. This hypothesis is based on the theoretical model of Pastor and Veronesi (2012), in which the announcement of changes in government policy - in this case the announcement of the anti-corruption campaign - increases investors' uncertainty and thus discount rates. As noted by Campbell and

Vuolteenho (2004), discount-rate news only temporarily affect stock returns. This paper thus complements event studies, by design focused on temporary effects, of the impact of the Chinese anti-corruption campaign on publicly listed Chinese firms that are active as sellers of goods and services in the luxury goods market and SOEs and Non-SOEs (Ke et al., 2017; Lin et al., 2017). A typical event study approach (with daily data as in Ke et al. (2017) and Lin et al. (2017)) is not feasible in the context of this paper because I focus on global firms whose stocks are traded on different exchanges and at widely different trading times. The analysis of daily data would limit the analysis to a small number of firms from a small set of countries. Working with data at lower frequencies allows broadening of the sample of this analysis and helps to assess the persistence of the potential impact of China's anti-corruption campaign on affected firms.

The empirical analysis proceeds in two steps. First, using monthly data from May 1993 to September 2016, I sort stocks of luxury goods firms into portfolios according to past exposure to the returns on the Chinese stock market. This first step allows me to distinguish between firms with high and low exposures to China at each point in time. This approach is motivated by the theoretical model of Pastor and Veronesi (2012). These authors find that government policy changes affect firms on average and particularly those firms that are highly exposed to government policy. As this paper focuses on the potential impact of a domestic (Chinese) government policy on global firms, the portfolio formation does not explain average returns on luxury goods firms' stocks per se. Rather, the portfolio formation serves as a tool to approximate differences in sensitivities to Chinese government policy by assuming that the sensitivities to the Chinese stock market return reflect exposures to Chinese government policy. This assumption is based on Allen et al. (2017), who show that listing and delisting on Chinese stock markets are processes that are subject to tight government control, which is "crowding out" private firms from the stock exchanges of mainland China. Moreover,

Allen et al. (2017) and Carpenter et al. (2015) highlight that it was the stated desire of the Chinese authorities to use the stock market mainly to raise funds for SOEs, which are, by definition, sensitive to changes in government policy.

The second step of the empirical analysis comprises time series regressions of excess returns on the portfolios of luxury goods firms' stocks on returns on portfolios that mimic global risk factors and tests whether estimates of the constant term in these regressions - the risk-adjusted portfolio return - vary over time. The underlying assumption of this second step is that global economic risks are captured by the returns on the factor mimicking portfolios while purely political risk will be reflected in the risk-adjusted returns (Pastor and Veronesi, 2013). By construction, the risk-adjusted returns are orthogonal to the risk factors and thus to economic risks. To assess whether we observed a persistent fall in risk-adjusted returns on the luxury firm portfolios, I test for structural breaks in the risk-adjusted returns.

The empirical analysis reveals strong evidence of exactly one structural break in the risk-adjusted returns of firms with high exposures to the Chinese stock market. The estimated break dates differ slightly across specifications and range from January 2013 to June 2013. The estimated break dates coincide with important events and announcements at the beginning of the recent Chinese anti-corruption campaign. The risk-adjusted returns on stocks of luxury goods firms with high China exposure were close to zero or marginally positive before the estimated break dates. After the break, the risk-adjusted returns were significantly negative. This downward shift was statistically significant, i.e., the risk-adjusted returns after the break date were significantly lower than the risk-adjusted returns before the break. This evidence is in line with the notion that the anti-corruption campaign affected global luxury goods firms because the timing of the break coincides with major events of the campaign. It is also in line with the hypothesis that the introduction of the anti-corruption campaign constituted adverse cash-flow news about affected luxury goods firms because risk-adjusted returns

shifted persistently downward after the estimated break dates.

Furthermore, there is tentative evidence that the intensity of the anti-corruption campaign, measured by the number of senior officials under investigation, had a marginal effect on risk-adjusted returns of luxury goods firms with high exposure to China.

None of these findings pertain to luxury goods firms with low exposure to the Chinese stock market. This evidence is in line with the notion that only firms with high exposure to China were affected by the latest anti-corruption drive. In addition, the main results of this paper are specific to firms from the luxury goods sector. Robustness checks with portfolios of globally operating industrial firms show that there is no evidence of variation in risk-adjusted returns on these firms' stocks irrespective of their exposure to China. This finding is natural given that the still ongoing anti-corruption campaign is focused on the reduction of bribes, which typically take the form of expensive gifts, i.e., luxury goods.

The remainder of this paper is organized as follows. Section 2 provides a short overview and timeline of the Chinese anti-corruption campaign. Section 3 outlines the economic background of this empirical study. Section 4 discusses the empirical framework. The data and their sources are described in section 5. Section 6 provides the main empirical results while section 7 concludes the paper. The appendix presents additional results and robustness checks.

2 China's anti-corruption campaign: basic background information

This section briefly describes the timeline and main events of the anti-corruption campaign that President Xi Jinping launched on 4 December 2012 by presenting eight instructions based on which leading officials should ad-

just their work style.[1] Lin et al. (2017) argue that this announcement and the instructions were perceived as the start of an anti-corruption campaign. Moreover, they also document that this event was unanticipated, coming shortly (approximately one month) after the presentation of a new Chinese leadership and quickly gained broad attention in the Chinese media. As no other major economic news occurred approximately 4 December 2012, Lin et al. (2017) conduct a study of the stock market responses of Chinese firms to this particular announcement and find significant effects.

However, the focus of this study is global firms traded on different stock exchanges in different time zones. It is not clear that stock market participants in, e.g., Zurich (Switzerland) did have the chance to realize the importance of this announcement for luxury goods firms traded on the SIX exchange in Zurich and to immediately adjust their positions accordingly. In addition, this paper focuses on the question of how persistent the potential effect of the anti-corruption campaign on stock returns of affected firms has been. Different events might have played a role in this respect as well and other major events of the anti-corruption campaign followed quickly. One was a speech by Xi Jinping on 22 January 2013 in which he clearly highlighted that both "tigers" (senior officials) and "flies" (lower ranked officials) were the target of his anti-corruption drive. [2] Further official announcements and arrests of prominent officials followed. For example, on 18 June 2013, the communist party formally launched an education campaign to eliminate the "four forms of decadence" among its cadres. Moreover, on 8 July 2013, the former railways minister was sentenced to a suspended death penalty for bribery. In addition, on 25 December 2013, the communist party laid out a five-year plan to set up a system for the punishment of inappropriate behavior of party or government officials. At the time of writing, the Chinese anti-corruption campaign is still ongoing.

[1] Ke et al. (2016) and Lin et al. (2017) provide English translations of these instructions.

[2] Ang et al. (2016) provide the English transcript of that part of the speech in which Xi Jinping refers to "tigers" and "flies".

Moreover, annual data from the Supreme People's Procuratorate show that this agency worked on about 33,000 corruption-related cases per year from 2008 to 2011. These numbers increased to 37,000 in 2012 and more than 40,000 in 2014. China Economic Review (Lockett, 2016) made these data publicly available on its website.[3] Hence, it was not necessarily the announcement of the anti-corruption campaign on 4 December 2012 as such that constituted a shift in government policy. Corruption has been punished before. The real policy change, and thus news to financial market participants, could have been the prosecution and punishment of senior officials or the sheer increase in corruption cases over the years since the introduction of the anti-corruption drive initiated by Xi Jinping.

Taken together, it is unclear whether a potentially persistent impact of the recent Chinese anti-corruption drive on the stock market performance of global luxury goods firms could be related to one specific event. Therefore, this paper does not impose any assumptions about potentially important events on the empirical analysis.

3 Economic background

We know from Campbell and Shiller (1988) and Campbell (1991) that unexpected variation in stock returns reflects either revisions of expectations of future dividends or revisions of expectations of future returns or a combination of both. More formally,

$$r^j_{t+1} - E_t r^j_{t+1} = (E_{t+1} - E_t) \left\{ \sum_{s=0}^{\infty} \rho^s \Delta d^j_{t+1+s} - \sum_{s=1}^{\infty} \rho^s r^j_{t+1+s} \right\} \qquad (1)$$

where r^j is the log return on stock j, d^j denotes log dividends, and E is the expectation operator. Furthermore, Δ denotes a one-period backward

[3] https://docs.google.com/spreadsheets/d/1a7YBxKOP5SNu8hRqF_EGc3WSfOzxvX1DWCgB7G4Bapw/edit?usp=

difference and ρ is a parameter close to unity but strictly below one.

An increase in expected cash flows must be associated with a capital gain, a rise in discount rates leads to a capital loss. Campbell and Vuolteenaho (2004) argue that returns caused by cash-flow news can be interpreted as return components that are very persistent because they affect the entire stream of dividends and are thus never reversed unless different and opposing cash-flow news occurs. In contrast, returns generated by discount-rate news are transitory because a capital loss due to discount-rate news today will be offset be lower expected returns in the future.

Judged by the media coverage of the Chinese anti-corruption campaign (Neue Zürcher Zeitung, 2015; The Economist, 2013, 2014 a,b), the announcement of this campaign and/or the subsequent steps to enforce the new anti-corruption rules signaled persistently lower expected earnings (and hence dividends) of luxury goods firms due to a persistent decline in the demand for luxury goods from China. In this view, the announcement of the anti-corruption campaign constituted adverse cash-flow news that has permanently affected the expected stream of cash flows from stocks of affected luxury goods firms. Hence, we should observe a persistent downward shift in expected returns on stocks of affected luxury goods firms after the announcement of the anti-corruption campaign.

However, the theoretical model of Pastor and Veronesi (2012) provides an alternative way to think about the potential economic channel through which the Chinese anti-corruption campaign could have affected the stock market performance of luxury goods firms. Its key empirical prediction is that the announcements of policy changes lead to a subsequent fall in stock prices of affected firms. The key mechanism is an increase in the discount rate due to higher uncertainty after the announcement of a policy change. The discount rate effect, however, only has a temporary impact on stock returns (Campbell and Vuolteenaho, 2004).

A priori, it is not clear what effect we should expect to find in the data.

4 Methodological background and empirical framework

4.1 Methodological background

The methodological background of the empirical framework is the basic asset pricing equation for excess returns on any asset i (Cochrane, 2005), i.e.,

$$0 = E_t(r_{t+1}^{i,e} m_{t+1}) \tag{2}$$

in which $r_{t+1}^{i,e}$ is the log return on asset i over the risk-free rate or over the return on a different risky asset, which is discounted with the stochastic discount factor, m_{t+1}.

Assuming a linear specification of the stochastic discount factor and normalizing the constant term in this linear specification to unity, leads to $m_{t+1} = 1 - f_{t+1}b$, in which f denotes a k-by-1 vector of risk factors and b the corresponding vector of factor loadings.

Plugging into (2) and taking unconditional expectations gives

$$E(r_t^{i,e}) = cov(r_t^{i,e,} f_t)b \tag{3}$$

after some rearranging.

Multiplying the right-hand side of equation (3) with $\Sigma_f^{-1}\Sigma_f$ (Σ_f is the variance/covariance matrix of the risk factors) helps to express equation (3) in terms of multiple regression coefficients instead of covariance terms. This beta representation of equation (3) obeys

$$E(r_t^{i,e}) = \beta^i \lambda \tag{4}$$

in which $\beta^i = cov(r_t^{i,e}, f_t)\Sigma_f^{-1}$ represents the sensitivity of the return on asset i to the risk factors (f) and $\lambda = \Sigma_f b$ denotes the prices of the risk factors.

4.2 Empirical framework

The empirical part of this paper approximates risk factors by global risk factor mimicking portfolios. Against this background, the empirical representation of equation (4) collapses to a time series regression because equation (4) applies to the excess returns on the risk-factor mimicking portfolios as well. The time series regression takes the following form

$$r_t^{i,e} = a^i + \beta_k^i f_t^k + \varepsilon_t^i, t = 1, ...T \tag{5}$$

in which f_t^k is a vector of returns on k risk factor mimicking portfolios.

All the explanatory variables are excess returns. Moreover, the dependent variables (returns on stock portfolios consisting of luxury goods firms) are also expressed as excess returns. Hence, the estimates of the constant in regression (5) should be zero if the explanatory variables provide an adequate description of the dependent variables (Black et al, 1972). If the regression coefficient of the constant turns out to be significantly different from zero, then there are significant "abnormal" or "risk-adjusted" average returns.

This paper focuses on the question of whether the introduction of the recent anti-corruption campaign has affected risk-adjusted returns on stocks of global luxury goods firms. The focus on risk-adjusted returns is based on the assumption that political risk is unrelated to the economic risks mirrored in the factor mimicking portfolios (Pastor and Veronesi, 2013). Hence, the assessment of this question uses a version of equation (5) in which the risk-adjusted return may vary over time, i.e.,

$$r_t^{i,e} = a_t^i + \beta_k^i f_t^k + \varepsilon_t^i, t = 1, ...T \tag{6}$$

and the time variation could occur in form of structural breaks, i.e., level shifts of the risk-adjusted returns.

5 Data

The sample period for the baseline empirical analysis runs from May 1993 to September 2016, restricted by the availability of Chinese stock market data. The data frequency is monthly.

5.1 Dependent variables: Portfolios of luxury goods firms based on exposure to Chinese stock market

5.1.1 Portfolio construction

This paper aims at assessing whether the Chinese anti-corruption campaign that started at the end of 2012 had an impact on the stock market performance of luxury goods firms. Against the backdrop of theoretical predictions regarding the link between stock prices and changes in government policy (Pastor and Veronesi, 2012), I assume that firms most exposed to the Chinese economy have been most affected by the anti-corruption campaign. However, it is likely that firm-specific exposure to China varies over time, which makes statements conditional on high and low exposure to China difficult at the level of individual firms.

To ensure that we can distinguish between firms with high and low exposure to China at each point in time, I sort excess returns on stocks of luxury goods firms into portfolios based on past sensitivities of these firms' stock returns to the Chinese stock market excess return. The economic assumption underlying this portfolio formation is that the sensitivity to the Chinese stock market reflects exposure to Chinese government policy. This assumption is based on Allen et al. (2017) and Carpenter et al. (2015), who argue that the establishment of a stock market on the Chinese mainland mainly served to raise funds for SOEs, which are by definition sensitive to changes in government policy and crowded-out private firms from mainland exchanges. In addition, Allen et al. (2017) find that listing or delistings on exchanges

in mainland China are tightly controlled by the government. Hence, Chinese government policy has a relatively strong direct influence on the Chinese stock market.

The advantage of using stock market data to measure the time-varying exposure to China is clear. There are no data revisions and Chinese stock market data are easily observable at high frequencies. While at the beginning of the sample period, swings in Chinese stock prices may have been more pronounced than in mature stock markets, Yan et al. (2007) argue that these ups and downs have become more muted with the growing financial integration of China witnessed in the late 1990s and early 2000s. Moreover, noise in the Chinese stock return series does not help to find a systematic relationship between returns on stocks of luxury goods firms and the proxy of the Chinese market portfolio.

Against this background, I build portfolios based on past sensitivities of returns of luxury goods firms' stocks (denominated in US dollars) in excess of the one-month US T-bill rate, $r^{i,e}_{t,t+1}$, to the Chinese stock market return expressed in US dollar and in excess of the US T-bill rate, $r^{CHN,e}_{t,t+1}$. The sensitivities $\hat{\beta}^i$ are obtained from regression

$$r^{i,e}_{t,t+1} = a + \beta^i r^{CHN,e}_{t,t+1} + \varepsilon^i_{t,t+1} \tag{7}$$

over a rolling time window from $t-\tau$ to $t-1$. The $\hat{\beta}^i$ estimated until $t-1$ are then used to sort the excess returns on stocks of luxury goods firms into bins at time t. In the baseline case, this paper uses $\tau = 60$ in the rolling window regressions and sorts luxury goods firms' returns into quintiles at time t based on $\hat{\beta}^i_{t-1}$. The portfolios are rebalanced every month. Throughout the paper or in the appendix, I provide additional results obtained from varying τ, the number of portfolios, or a combination of both.

The excess returns in each portfolio are weighted by the respective firm's market capitalization to limit the influence of small firms. I present robustness checks with equal-weighted portfolio returns in the appendix.

In principle, direct information about exposure to China, e.g., sales volume, would be clearly preferable to the portfolio formation based on estimated exposures to the Chinese stock markets. However, such detailed information is available only at the annual frequency for a relatively short time span (typically not before 2008 or 2009) and only for a subset of the firms under study. Due to this limitation in terms of data availability, I opted to form portfolios based on the regression in equation (7).

5.1.2 Data

The sample of luxury goods firms under study comprises publicly listed luxury goods firms[4] that were among the 100 biggest (by sales) luxury goods firms in the report "Global Powers of Luxury Goods 2016" by Deloitte (Deloitte, 2016). In total, there are 47 firms among these 100 firms that are or have been publicly listed on stock exchanges. Most of these firms own a variety of brands and thus do not necessarily represent one specific sector among luxury goods firms. The stock price and market capitalization of these firms has been downloaded from Thompson Reuters Datastream. The appendix provides a list of the name of the companies, their Datastream code, the sample period over which the firm-specific data is available and the currency denomination.

Because only approximately one half of the luxury goods firms covered by the Deloitte (2016) report are in the sample of this paper, I cannot meaningfully distinguish between specific subsectors of the luxury goods firms. In principle, it would be interesting to see, e.g., whether producers of luxury watches were differently affected from the anti-corruption campaign than luxury fashion firms. However, such a sectoral breakdown is not really feasible in the context of this paper because of the limited number of firms in the sample.

[4]Some of these firms also produce "non-luxury" goods but generate most of their revenues from the sale of luxury goods.

Moreover, seven of the 47 firms in the sample are traded on the Hong Kong stock exchange, which might affect the portfolio allocation and place these firms constantly in the high exposure bin. The appendix shows that the main results of this paper are qualitatively unaffected by the exclusion of these firms.

I use end-of-month bilateral exchange rates vis-à-vis the US dollar to convert the stock prices and market values into a common currency to form value-weighted portfolios and to be consistent with the currency denomination of the explanatory variables used to compute risk-adjusted portfolio returns.

As a proxy of the Chinese market portfolio, I use the MSCI China index denominated in US dollars. According to the MSCI China factsheet (MSCI, 2017), the index covers approximately 85% of all Chinese shares. The MSCI China index comprises information about all types of Chinese shares, i.e., Chinese shares that are listed in Hong Kong or in the Mainland. In addition, it includes shares that are fully open for foreign investment and those for which foreign investment is restricted. The appendix reports descriptive statistics of the portfolio returns.

5.2 Risk factors to compute risk-adjusted portfolio returns

To control for the impact of global risks on the average returns on the luxury goods firms' portfolios, I use the Fama and French (2015, 2017) global five-factor model and augment it with the global version of the Carhart (1997) momentum factor, i.e., the return difference between portfolios of stocks that offered high returns in the recent past and stocks that offered low returns in the recent past (WML). This risk adjustment helps to take the distinction between economic risks, reflected by the risk factors, and unrelated political risk, potentially reflected in the risk-adjusted returns on the portfolios, into account (Pastor and Veronesi, 2013).

Since this paper focuses on the analysis of risk-adjusted returns, it is important to employ empirical proxies of risk factors in the form of excess returns on tradable portfolios as both dependent and explanatory variables. Thus, the Fama-French five-factor model is a natural choice for the purpose of this study. In addition, all of the risk factor mimicking portfolios employed in this model can be motivated from basic accounting identities linking stock returns to measures of cash flows.

The Fama-French five-factor model comprises returns on the global market portfolio in excess of the risk-free rate (RM), return differences between global stock portfolios sorted according to size (SMB), ratio of book value to market value (HML), operating profitability (RMW) and investment (CMA). All of the global portfolio returns are based on data denominated in US dollar. These data (including a global version of the Carhart (1997) momentum factor) are freely available on Kenneth French's website.[5]

5.3 Data on anti-corruption investigations

I use monthly data from the Central Commission for Discipline Inspection (CCDI) to assess whether accounting for the number and the rank of officials under investigation in the anti-corruption campaign - an approximation of the intensity of the campaign - matters for evaluating stock returns of global luxury goods firms. The original CCDI data has been translated, compiled and made publicly available by the China Economic Review (Lockett, 2016) on its website.[6]

The data are available only from September 2013 to December 2015 but allow for distinguishing between the numbers of officials under investigation at various hierarchical levels of the communist party and of the bureaucracy (provincial and ministerial level, prefecture and department, county and division, branch and township). Officials at the top of the hierarchy are labeled

[5]http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

[6]https://docs.google.com/spreadsheets/d/1a7YBxKOP5SNu8hRqF_EGc3WSfOzxvX1DWCgB7G4Bapw/edit?usp=

"tigers" using the wording introduced by President Xi Jinping. The other officials are lower ranked and were referred to as "flies" in the words of Xi Jinping (Ang et al, 2016). The distinction is not clear-cut. In the baseline regressions I use a broad definition of "tigers" that includes all officials higher than the branch and township level. As robustness check, I use a narrower definition of "tigers" that comprises only officials at the provincial and ministerial level and prefecture and department level.

Figure (1) shows the time series of the z-standardized number of investigations of "tigers" and "flies" over the two-year period from September 2013 to December 2015. The monthly dynamics of "tigers" and "flies" investigations differ from each other, which motivates the examination of whether this distinction matters in the empirical analysis.

[about here figure (1)]

6 Empirical results

As emphasized in section 3, it is a priori unclear whether the Chinese anti-corruption campaign has had a persistent or temporary effect on the risk-adjusted excess returns on the portfolios of stocks of luxury goods firms or if it had any effect at all. The first subsection tests the risk-adjusted returns on the portfolios with high and low exposure to China for structural breaks. Evidence in favor of a structural break around major event dates of the anti-corruption campaign would support the hypothesis of a persistent impact of the anti-corruption campaign on returns of stocks of luxury goods firms. The second subsection uses regression-based analysis to study temporary and persistent effects of the anti-corruption campaign on the excess returns of the luxury goods portfolios.

6.1 Testing for (multiple) structural breaks in risk-adjusted returns

This section evaluates whether the data supports the hypothesis that the Chinese anti-corruption campaign has negatively and persistently affected risk-adjusted excess returns on stocks of luxury goods firms without imposing any knowledge about the timing of the introduction of the Chinese anti-corruption campaign. Therefore, I use the Bai and Perron (Bai and Perron, 1998, 2003) test[7] for (multiple) structural breaks in time series data to assess whether we a) find structural breaks in the risk-adjusted returns on the portfolios of luxury goods firms with high and low China exposure and b) to let the data speak about the timing of the potential structural breaks.

Following Bai and Perron (1998, 2003), I use the excess returns on the high and low exposure portfolios as dependent variables ($r_t^{i,e}$) and run the regression in equation (6) to test for n breaks in the risk-adjusted return (estimates of a_t^i), i.e.,

$$r_t^{i,e} = a_t^i + \beta_{RM}^i RM_t + ... + \beta_{WML}^i WML_t + \varepsilon_t, t = T^{k-1} + 1, ...T^k \qquad (8)$$

for $k = 1, ...n + 1$. The breakpoints $T^1, ...T^n$ are treated as unknown and estimated along the lines suggested by Bai and Perron (1998, 2003) by calculating the global minimum of the sum of squared residuals from each possible partition of the data into $n + 1$ regimes.

I apply the structural break test to the two corner portfolio returns, i.e., the returns on the portfolio comprising stocks with lowest exposure to the Chinese stock market and its counterpart comprising stocks with highest exposure to the Chinese stock market. In the specification of tests, I allow for a maximum number of five breaks in the constant term of regression (8) and different moment matrices of the regressors in the different regimes. Table

[7] I use the MATLAB code written by Yohei Yamamoto for these tests, which is freely available on Pierre Perron's website.

(1) reports two test statistics. The first one, UD^{max}, tests the null hypothesis of no structural break against the alternative hypothesis of five structural breaks, i.e., it indicates whether there is any evidence of at least one structural break. The other test sequentially evaluates the null hypothesis of n breaks against the hypothesis of $n+1$ breaks with $n = 0, ...5$ to evaluate the number of potential structural breaks.

The results of the Bai and Perron (1998, 2003) test displayed in panel A of table (1) support the view that there is a structural break in the risk-adjusted return on the portfolio of luxury goods firms with high exposure to the Chinese stock market. We can reject the null of no structural break against the alternative of five structural breaks at the 95% confidence level. This is not the case for the portfolio comprising stocks of luxury goods firms with low exposure to China. There is no evidence of a structural break for these firms. Moreover, the sequential test suggests that there is exactly one structural break in the risk-adjusted returns on the high exposure portfolio. We cannot reject the null of one structural break against the alternative of two structural breaks. This is not the case for the return on the portfolio of firms with low exposure to China. In this case, we do not observe any evidence of a structural break in the risk-adjusted portfolio return.

Panel B gives the estimated mean of the risk-adjusted excess return on the high exposure portfolio in the two regimes (before and after the structural break). Before the break, the average risk-adjusted return was positive and, in this case, marginally different from zero. After the break, the estimated risk-adjusted return was negative and significantly different from zero.

The break date is estimated to be in January 2013. This date is close to the announcement of the anti-corruption campaign in December 2012 and coincides with the month in which President Xi Jinping highlighted that officials at all hierarchical levels would be subject to investigations. There is uncertainty regarding the exact break date. The 90% confidence band spans the time from September 2010 to June 2014. However, the major events

of the anti-corruption campaign are well within this confidence band. The appendix presents further evidence for the robustness of this result.

[about here table (1)]

To give a visual impression of the numbers presented in table (1), figure (2) depicts the time series of the risk-adjusted return on portfolio P5 (high exposure to the Chinese stock market) and the mean risk-adjusted return in the two regimes before and after the break date.

[about here figure (2)]

For completeness, table (2) reports the regression coefficient estimates from regression (5) with Newey and West (1987) corrected t-statistics in parenthesis. Irrespective of whether we regard the portfolio of luxury firms with low or high past sensitivity to the Chinese stock market, the estimate of the constant is not significantly different from zero. Hence, on average, there is no evidence of significant risk-adjusted returns on these portfolios irrespective of their exposure to China. This observation is no contradiction to the structural break tests for the high exposure portfolio return because the estimated structural break and the associated negative risk-adjusted returns occurred relatively late in the sample period such that they did not significantly affected the average risk-adjusted returns over the full sample period.

For all portfolios, the regression coefficients of the global market return are significantly different from zero and increase almost monotonically from the low China exposure to the high China exposure portfolios. They vary between unity and 1.5. Few of the other risk factors exhibit a statistically significant link to the portfolio returns. The R^2 statistics are relatively low, ranging from 36% to 59%.

Furthermore, the structural break tests assume that the sensitivities to the risk factors do not vary over time. To test for this hypothesis, I employ the test of stability of parameter estimates by Elliott and Müller (2006).

This test uses full sample information to test for stability of the regression coefficients but does not specify the precise nature of the underlying process of time variation. Table (2) reports the test statistic of this test under the column "qll". This test leaves the impression that there is little evidence of time-variation in the regression coefficients. It seems that sorting on past, time-varying exposures to the Chinese stock market return has already taken into account possible time variation in the risk factor sensitivities. Hence, the assumption that the regression coefficients of the risk factors can be treated as constant in the structural break tests appears to be justified.

[about here table (2)]

6.2 Significant differences in risk-adjusted returns before and after structural break

The structural break tests from the previous section leave the impression that the risk-adjusted excess returns on portfolios comprising luxury goods firms with high exposure to the Chinese stock market experienced a structural break. The break date is close to the timing of the introduction of the Chinese anti-corruption campaign and coincides with one of the major events of this campaign. This suggests that the Chinese anti-corruption campaign has had an impact on the excess returns on stocks of affected luxury goods firms and that this effect has been persistent.

Against this background, this subsection uses indicator dummies to impose the timing of the estimated break date - close to major events of the anti-corruption campaign - to assess whether the downward shift of the mean risk-adjusted return on the high exposure portfolio was significant.

Therefore, I define two dummy variables. The first dummy, d_t^{imp}, represents an indicator of the month of the estimated structural break from the previous section. It takes a value of one in January 2013, and zero otherwise. Moreover, I define a step dummy (d_t^{step}) that takes values of one for all

months from February 2013 to the end of the sample period in September 2016 and zero for all months before February 2013. The regression coefficient of this dummy measures whether the risk-adjusted return on the portfolios of luxury goods firms has been persistently different from its average value from the estimated break date to the end of the sample period.

I augment the baseline regressions with these two dummies and run the following regression

$$\begin{aligned} r_t^{i,e} &= a^i + \gamma^i d_t^{imp} + \delta^i d_t^{step} \\ &+ \beta_{RM}^i RM_t + \beta_{SMB}^i SMB_t + \beta_{HML}^i HML_t \\ &+ \beta_{RMW}^i RMW_t + \beta_{CMA}^i CMA_t + \beta_{WML}^i WML_t + \varepsilon_t^i, t = 1, ...T \end{aligned} \tag{9}$$

in which the estimates of γ^i and δ^i $(i = high, low)$ indicate whether we observe a jump or a level shift in the risk-adjusted return on the portfolios of luxury goods firms in the month of the announcement of the anti-corruption campaign and in the months thereafter.

Table (3) presents only the coefficient estimates of the constant and the two dummies from the regression (9) because the other estimates are similar to the ones shown in table (2). The dependent variables are the returns on the portfolios of stocks of luxury goods firms with highest and lowest exposure to the Chinese stock market. The table provides results for portfolio sorts based on different lengths of the rolling time window to estimate the exposures.

The results of this regression are in line with the evidence of a structural break in the return on the high-exposure portfolio after the announcement of the Chinese anti-corruption campaign. The estimates of δ^{high} are all significantly different from zero and negative, i.e., there is evidence of a level-shift in the risk-adjusted return on the high China exposure portfolio after the month of the estimated break date. Risk-adjusted excess returns on the luxury goods firms' portfolio with high exposure to the Chinese stock market are significantly lower after the break than on average. The point estimates of

the downward shift are approximately minus three percent per month. This finding does not pertain to the low exposure portfolio return. The estimates of δ^{low} are not different from zero at conventional significance levels.

The estimates of γ^i exhibit strong differences between the high and low exposure portfolios. The regression coefficients of the step dummy are positive and significant for the returns on the portfolio comprising firms with high exposures to the Chinese stock market. We observe the opposite pattern, i.e., negative and statistically significant estimates of γ^i for the low exposure portfolio. This evidence could be interpreted as an announcement effect as predicted by the theoretical model of Pastor and Veronesi (2012). Since the low exposure portfolio is not supposed to be directly affected by the announcement of the Chinese government to broaden the scope of the anti-corruption campaign to senior officials, these estimates suggest that market participants temporarily viewed the Chinese anti-corruption campaign as an adverse shock to all luxury goods firms. However, as the structural break tests and the estimates of δ^i suggest, this view did not last for long.

[about here table (3)]

6.3 Risk-adjusted returns and the intensity of the anti-corruption campaign

The previous two subsections have highlighted that there was a significant downward shift in risk-adjusted returns on stocks of luxury goods firms with high exposure to the Chinese stock market. The shift coincided with a major event of the Chinese anti-corruption campaign, and it was persistent.

This subsection provides tentative answers to the question of whether the intensity of the anti-corruption drive affects the empirical results. This assessment is limited by the availability of data. Nonetheless, this assessment is useful to assess whether a time series directly linked to the recent anti-corruption drive reveals a significant relation to the risk-adjusted returns on

portfolios of luxury goods with high China exposure.

I use the number of investigations of officials as an empirical proxy of the campaign intensity. As shown in figure (1), the patterns in the data differ between "tigers" and "flies". The number of "tigers" under investigation increased at the end of that period, while the number of "flies" under investigation reached its peak earlier. Section 2 has already speculated that the investigation of senior officials might have been the real news related to the recent Chinese anti-corruption campaign. For example, Liu et al. (2017) show that the investigation and trial of Bo Xilai, a potential contender for a place at the top of the Chinese communist party in 2012, constituted an exogenous political shock that had significant adverse effects on the stock market performance of Chinese firms.

To assess whether the intensity with which "tigers" and "flies" came under scrutiny of the Chinese authorities is associated with a more pronounced downward shift in risk-adjusted returns on stocks of luxury goods firms, I use the regression in equation (9) and additionally interact d_t^{step} with the z-standardized number of "tigers" and "flies" (z_t^{tigers}, z_t^{flies}) depicted in figure (1). The regression equation then takes the following form

$$\begin{aligned} r_t^{i,e} = {} & a^i + \delta^i d_t^{step} + \delta^{i,tiger}(d_t^{step} z_t^{tigers}) + \delta^{i,flies}(d_t^{step} z_z^{flies}) \\ & + \gamma^i d_t^{imp} + \beta_{RM}^i RM_t + \beta_{SMB}^i SMB_t + \beta_{HML}^i HML_t \\ & + \beta_{RMW}^i RMW_t + \beta_{CMA}^i CMA_t + \beta_{WML}^i WML_t \\ & + \varepsilon_t^i, t = 1, ...T \end{aligned} \tag{10}$$

The estimates of $\delta^{i,tiger}$ and $\delta^{i,flies}$ are presented in table (4). They indicate whether the number of investigations of high-ranking or low-ranking officials coincides with an additional, marginal change in the risk-adjusted returns of the luxury goods firms portfolios after the estimated break date, which is the period after the speech by Xi Jinping in which he stressed that both senior and lower rank officials were under scrutiny. The sample period

of the regression in equation (10) ends in December 2015 because this is the last data point for the number of "tigers" and "flies" under investigation.

As in the previous subsection, I distinguish between portfolio sorts based on different time windows to compute sensitivities to the Chinese stock market to distinguish between high and low China exposure luxury goods firms. This distinction, however, does not seem to be important in regression (10). The estimates of $\delta^{i,tiger}$ are negative and significantly different from zero for the high exposure portfolios in all three cases. The point estimates range from -1.5 to -1.9. This evidence indicates that the risk-adjusted return on the portfolio of firms with high China exposure shifted marginally more downward when the number of investigations of senior officials was relatively high during the anti-corruption campaign. This finding does not pertain to the interaction of the step dummy with the number of lower ranked officials under investigation. Moreover, the results for the low exposure portfolio again highlight that there is no significant shift in risk-adjusted returns after the announcement of the anti-corruption campaign for this portfolio. If anything, there are higher risk-adjusted returns when the number of investigations of officials from low ranks was high.

[about here table (4)]

However, these results should be interpreted with caution. The appendix shows that the statistical significance of these results partly depends on the exact definition of "tigers". While the sign of $\delta^{i,tiger}$ continues to be negative irrespective of the definition of "tigers" and irrespective of variations of regression (10), its statistical significance varies across specifications.

6.4 Are luxury goods firms special?

The introduction of the Chinese anti-corruption campaign was clearly aimed at curbing the consumption of luxury goods of Chinese officials. Indeed, the main results of this paper have shown that stock returns of global luxury

goods firms with high exposure to the Chinese stock market were affected by the anti-corruption campaign. Does this finding apply to other industries as well? To assess this question, I repeat the baseline analysis with portfolios of global industrial companies. The appendix provides a list of the industrial companies used in this robustness check.

Using the stock returns of these companies, I built portfolios distinguishing between high and low exposures to the Chinese stock market. As in the baseline empirical analysis of the luxury goods firms, I build five portfolios distinguishing between returns on stocks of industrial firms with high and low sensitivities to the Chinese stock market. I obtain the time series of sensitivities to the Chinese stock market from rolling window regressions with a window of 60 months. Then, I conduct the same empirical assessments as with the portfolios of luxury goods firms.

In contrast to the evidence presented in the main body of the paper, I do not find any evidence of a structural break in the risk-adjusted returns on the industrial companies' stock portfolios, irrespective of whether we regard low or high China exposure portfolios. Table (5) summarizes the results of the structural break tests. The test results highlight that there is no sign of a level shift in risk-adjusted returns on the portfolios of global industrial companies.

This evidence is natural given that the particular policy change under study has a clear but narrow target, namely, limiting the consumption of luxury goods (potentially representing bribes) of Chinese officials. Other industrial sectors than the luxury goods sector hence do not have to be affected by this policy change.

[about here table 5]

7 Conclusions

This paper has empirically assessed whether the stock market performance of globally active luxury goods firms has been affected by the recent Chinese anti-corruption campaign. The evidence suggests that returns on portfolios comprising luxury goods firms with high exposure to China experienced a structural break in their risk-adjusted returns around the time when the recent anti-corruption campaign started. The risk-adjusted returns of these firms shifted significantly downward after the estimated break date, which coincides with major events in the Chinese anti-corruption campaign. These results survive a variety of robustness checks. Moreover, there is evidence that the risk-adjusted returns vary with the intensity of the anti-corruption campaign, as measured by the number of senior officials under investigation. These findings neither pertain to luxury goods firms with low exposure to China nor to the stock returns of firms from other industries. Taken together, the evidence presented in this paper is in line with the hypothesis that global luxury goods firms have been persistently affected by the Chinese anti-corruption campaign.

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Tables

Table 1: Structural breaks in risk-adjusted returns

Panel A: Testing for number of structural breaks				
	UD^{max}	$F(1 \mid 0)$	$F(2 \mid 1)$	$F(3 \mid 2)$
P1 (low)	4.06	4.06	1.56	0.32
P5 (high)	11.63**	11.63**	2.06	5.26
Critical values:				
10%	7.46	7.04	8.51	9.41
5%	8.88	8.58	10.13	11.14
1%	12.37	12.29	13.89	14.80

Panel B: Mean excess returns before and after the structural break date			
	Regime 1	Regime 2	Break date (90% CI)
P5 (high)	1.04*	-2.80***	Jan 2013
(t-statistic)	(1.77)	(-2.90)	(Sep 2010; June 2014)

Notes: This table uses the Bai and Perron (1998, 2003) test for multiple structural breaks to assess whether we observe a break in excess returns on stock portfolios of luxury goods firms conditional on being little (P1) or highly (P5) exposed to the Chinese stock market. Panel A gives test statistics and critical values for two structural break tests. UD^{max} tests the null hypothesis of no structural break against the alternative hypothesis of five structural breaks. $F(1 \mid 0)$ tests the null of no structural break against the alternative of one structural break. Correspondingly, $F(2 \mid 1)$ tests the null of exactly one structural breaks against the alternative of two structural breaks. For the portfolio return exhibiting a structural break, panel B shows the mean of the risk-adjusted portfolio return before and after the break date along with its t-statistic. Moreover, it provides the estimated break date and the 90% confidence interval of the estimated break date. *,** and *** denote significance at the 10%, 5% and 1% level, respectively

Table 2: Baseline regressions: risk-adjusted returns

	constant	RM	SMB	HML	RMW	CMA	WML	R^2	qll
P1 (low)	-0.62	0.99***	-0.03	0.56*	0.30	-0.33	0.06	0.36	-23.38
(t-stat)	(-1.61)	(8.94)	(-0.13)	(1.95)	(0.97)	(-0.88)	(0.47)		
P2	-0.24	1.21***	-0.16	-0.03	0.50**	0.13	-0.02	0.53	-33.69*
(t-stat)	(-0.96)	(13.06)	(-0.79)	(-0.11)	(2.18)	(0.35)	(-0.22)		
P3	-0.03	1.21***	0.06	-0.52	0.62*	0.62*	-0.16	0.47	-21.45
(t-stat)	(-0.07)	(9.75)	(0.25)	(-1.63)	(1.95)	(1.69)	(-1.23)		
P4	-0.50	1.49***	0.33	-0.36	0.88**	0.26	-0.19**	0.59	-26.30
(t-stat)	(-1.19)	(10.68)	(1.01)	(-1.16)	(2.57)	(0.66)	(-2.05)		
P5 (high)	0.26	1.30***	0.67***	-0.60**	0.45	0.57	-0.34***	0.42	-31.25
(t-stat)	(0.48)	(8.58)	(2.69)	(-2.19)	(1.38)	(1.51)	(-3.46)		

Notes: This table presents coefficient estimates and their Newey and West (1987) corrected t-statistics from regressions of returns on portfolios of stocks of luxury goods firms in excess of the one-month US T-bill rate. Firms are allocated into portfolios at time t on the basis on their stock return's past exposure to the Chinese stock market from rolling regressions with time window from t-60 to t-1. P1(low) denotes the portfolio comprising the firms in the quintile with lowest exposure to the Chinese stock market. The exposures increase from portfolio P1 to P5 (highest exposure). R^2 is the measure of fit adjusted for the number of regressors. *,** and *** denote significance at the 10%, 5% and 1% level, respectively. The column under the heading "qll" gives the test statistic of the Elliott and Müller (2006) test of time-variation in parameters. The null hypothesis is stability of the parameter. The critical values are: 1% = -40.24, 5%=-35.74, 10%=-33.45.

Table 3: Testing for shifts in risk-adjusted excess return on the portfolio of luxury goods firms with high and low exposure to China

portfolio allocation based on time window of							
60 months							
high exposure				low exposure			
	constant	d^{imp}	d^{step}		constant	d^{imp}	d^{step}
coeff	1.05**	2.16*	-3.86***	coeff	-0.63	-4.63***	0.12
(t-stat)	(2.00)	(1.75)	(-3.83)	(t-stat)	(-1.58)	(-4.45)	(0.14)
48 months							
high exposure				low exposure			
coeff	0.96*	2.52**	-2.71***	coeff	-0.50	-8.32***	-1.50*
(t-stat)	(1.81)	(2.00)	(-3.99)	(t-stat)	(-1.17)	(-7.49)	(-1.83)
36 months							
high exposure				low exposure			
coeff	1.12**	2.65**	-3.12***	coeff	-0.27	-6.94***	-0.35
(t-stat)	(2.21)	(2.20)	(-4.37)	(t-stat)	(-0.64)	(-5.66)	(-0.43)

Notes: This table provides coefficient estimates and their Newey and West (1987) corrected t-statistics from regressions of excess returns on portfolios of stocks of luxury goods firms with high and low exposure to the Chinese stock market return on a constant and two dummies, additionally controlling for global risk factors. The exposures for the portfolio allocation are estimated from regressions over rolling windows of 60, 48 and 36 months. *,** and *** denote significance at the 10%, 5% and 1% level, respectively
The two dummies are defined as follows. d_t^{imp} is an indicator of the estimated break date in the baseline specification that takes a value of one in January 2013, and zero otherwise. Furthermore, I define d_t^{step} as an indicator taking values of one for all months from February 2013 to the end the sample period in September 2016 and zero for all months before February 2013. The regression coefficient of this dummy indicates whether the average risk-adjusted return since the estimated structural break is significantly different from its average value.

Table 4: Announcement of anti-corruption campaign: Does the distinction between "tigers" and "flies" matter?

	high exposure				**low exposure**			
	portfolio allocation based on time window of							
	60 months							
	constant	d^{step}	$d^{step} z_t^{tigers}$	$d^{step} z_t^{flies}$	constant	d^{step}	$d^{step} z_t^{tigers}$	$d^{step} z_t^{flies}$
coeff	1.08**	-3.79***	-1.89**	0.06	-0.65	0.20	-0.79	2.11*
(t-stat)	(2.04)	(-3.38)	(-2.33)	(0.07)	(-1.61)	(0.29)	(-1.16)	(1.70)
	48 months							
coeff	0.99*	-2.67***	-1.49**	-0.18	-0.47	-1.52	0.10	-0.10
(t-stat)	(1.81)	(-3.80)	(-2.17)	(-0.20)	(-1.07)	(-1.53)	(0.10)	(-0.09)
	36 months							
coeff	1.13**	-3.16***	-1.84**	0.42	-0.27	-0.05	-0.93**	2.06**
(t-stat)	(2.18)	(-4.34)	(-2.09)	(0.34)	(-0.64)	(-0.07)	(-2.03)	(2.08)

Notes: This table provides coefficient estimates and their Newey and West (1987) corrected t-statistics from regressions of excess returns on portfolios of stocks of luxury goods firms with high and low exposure to the Chinese stock market return on a constant and two dummies (d^{imp}, d^{step}) and two interaction terms, additionally controlling for global risk factors. One of the dummies,d^{step}, is interacted with the z-standardized number of high ranking officials ("tigers") and low ranking officials ("flies"). The data on the number of investigations are available from September 2013 to December 2015. The exposures for the portfolio allocation are estimated from regressions over rolling windows of 60, 48 and 36 months. *,** and *** denote significance at the 10%, 5% and 1% level, respectively. d_t^{step} is an indicator of the period after the estimated break date in the baseline specification that takes values of one for all months from February 2013 to the end of the sample period in December 2015, and zero for all months before February 2013.

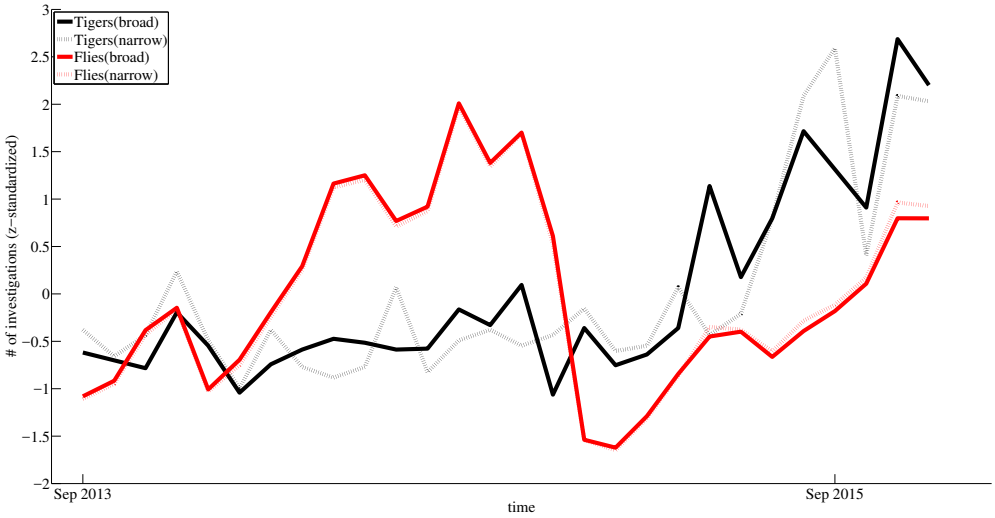
Table 5: Structural breaks in risk-adjusted returns of industry portfolios?

Testing for number of structural breaks				
	UD^{max}	$F(1 \mid 0)$	$F(2 \mid 1)$	$F(3 \mid 2)$
P1 (low)	4.31	2.62	1.29	1.30
P5 (high)	2.50	2.50	2.06	0.46
Critical values:				
10%	7.46	7.04	8.51	9.41
5%	8.88	8.58	10.13	11.14
1%	12.37	12.29	13.89	14.80

Notes: This table presents results of the Bai and Perron (1998, 2003) structural break test for excess returns on portfolios of global industrial companies with high and low exposure to the Chinese stock market. Refer to the notes in table (1) for details of the structural break test.

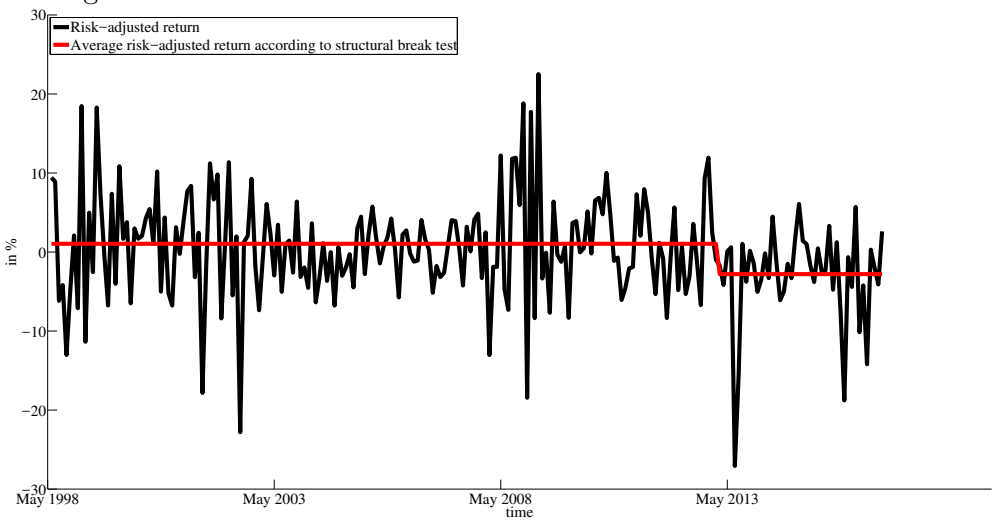
Figures

Figure 1: Tigers vs. Flies



Notes: This figure provides the z-standardized number of officials under anti-corruption investigation distinguished by rank of the officials. The available data allows for distinguishing between four hierarchical levels: provincial and ministerial level, prefecture and department, county and division, branch and township. The broad definition of "tigers" includes all officials in higher ranks than the branch and township level. The narrow definition of "tigers" that comprises only officials at the provincial and ministerial level and prefecture and department level. "Flies" are all of the other respective officials.

Figure 2: Risk-adjusted returns (raw time series) and mean returns in the two regimes



A Additional data information.

Table (6) lists the luxury goods firms that form the sample of this study. Apart from the company name, the table gives the Thompson Reuters Datastream code of the companies, the currency in which their stock prices (and the market capitalization) are expressed and the firm-specific sample period.

Table 6: Sample of luxury goods firms

company name	Datastream code	Currency	Data begin	Data end
LVMH	916658	EUR	May 1993	Sep 2016
Richemont	779102	CHF	May 1993	Sep 2016
Estee Lauder	867375	USD	Nov 1995	Sep 2016
Luxottica	255249	EUR	Dec 2000	Sep 2016
Swatch	729056	CHF	May 1993	Sep 2016
Kering	923657	EUR	May 1993	Sep 2016
Chow Tai Fook	86125D	HKD	Dec 2011	Sep 2016

L'Oreal	923386	EUR	May 1993	Sep 2016
Ralph Lauren	894145	USD	June 1997	Sepr 2016
PVH	921218	USD	May 1993	Sep 2016
Hermes	309037	EUR	June 1993	Sep 2016
Shiseido	905323	JPY	May 1993	Sep 2016
Lao Feng Xiang	316669	USD	May 1993	Sep 2016
Prada	77253U	HKD	June 2011	Sep 2016
Michael Kors	86532T	USD	Dec 2011	Sep 2016
Tiffany	745110	USD	May 1993	Sep 2016
Coach	266220	USD	Oct 2000	Sep 2016
Burberry	25968K	GBP	July 2002	Sep 2016
BOSS	504458	EUR	May 1993	Sep 2016
Coty	87310L	USD	June 2013	Sep 2016
Chow Sang Sang	771574	HKD	May 1993	Sep 2016
Pandora	70254J	DKK	Oct 2010	Sep 2016
Christian Dior	539616	EUR	May 1993	Sep 2016
Clarins	905397	EUR	May 1993	Aug 2008
Fossil	325453	USD	May 1993	Sep 2016
Luk Fook	890221	HKD	May 1997	Sep 2016
Titan	147317	INR	May 1993	Sep 2016
Savaltore Ferragamo	77306M	EUR	June 2011	Sep 2016
Safilo	32506N	EUR	Dec 2005	Sep 2016
L'Occitane	69261D	HKD	May 2010	Sep 2016
Tod's	269965	EUR	Nov 2000	Sep 2016
Gitanjali	35929F	INR	March 2006	Sep 2016
Kate Spade	997563	USD	May 1993	Sep 2016
PC Jeweller	87984W	INR	Dez 2012	Sep 2016
Elizabeth Arden	867926	USD	Dec 1995	Sep 2016
Moncler	89376	EUR	Dec 2013	Sep 2016

Renown	932346	JPY	May 1993	Feb 2004
	28538H	JPY	Mar 2004	Sep 2016
Tumi	87047W	USD	April 2012	Sep 2016
Movado	324953	USD	Sep 1993	Sep 2016
Inter Parfums	517522	USD	May 1993	Feb 2004
Marcolin	672733	EUR	July 1999	January 2013
True Religion	26854H	USD	May 2003	July 2013
Aeffe	50862N	EUR	July 2007	Sep 2016
Trinity	68153E	HKD	Nov 2009	Sep 2016
Mulberry	870969	GBP	May 1996	Sep 2016
Wolford	143539	EUR	Feb 1995	Sep 2016
Damiani	51269K	EUR	Nov 2007	Sep 2016

Table (7) gives the corresponding information about global industrial firms that are used to assess whether the paper's main results are specific to luxury goods firms.

Table 7: Sample of industrial companies

company name	**EIKON RIC**	**Currency**	**Data begin**	**Data end**
General Electric	GE.N	USD	May 1993	Sep 2016
3M Co	MMM.N	USD	May 1993	Sep 2016
Siemens AG	SIEGn.DE	EUR	May 1993	Sep 2016
United Parcel Service	UPS.N	USD	Nov 1999	Sep 2016
Boeing	BA.N	USD	May 1993	Sep 2016
United Technologies	UTX.N	USD	May 1993	Sep 2016
Honeywell International	HON.N	USD	May 1993	Sep 2016
Union Pacific	UNP.N	USD	May 1993	Sep 2016
Lockheed Martin	LMT.N	USD	Mar 1995	Sepr 2016
E I du Pont de Nemours and Co	DD.N	USD	May 1993	Sep 2016
Caterpillar	CAT.N	USD	May 1993	Sep 2016

General Dynamics	GD.N	USD	May 1993	Sep 2016
Airbus	AIR.PA	EUR	June 1999	Sep 2016
Canadian National Railway	CNR.TO	CAD	Nov 1996	Sep 2016
ABB	ABBN.S	CHF	May 1993	Sep 2016
FedEx	FDX.N	USD	May 1993	Sep 2016
Automatic Data Processing	ADP.OQ	USD	May 1993	Sep 2016
Keyence	6861.T	JPY	May 1993	Sep 2016
Illinois Tool Works	ITW.N	USD	May 1993	Sep 2016
Raytheon	RTN.N	USD	May 1993	Sep 2016
CSX	CSX.OQ	USD	May 1993	Sep 2016
Schneider Electric	SCHN.PA	EUR	May 1993	Sep 2016
Jardine Matheson	JARD.SI	USD	Jan 1995	Sep 2016
Deutsche Post	DPWGn.DE	EUR	Nov 2000	Sep 2016
Northrop Grumman	NOC.N	USD	May 1993	Sep 2016
Vinci SA	SGEF.PA	EUR	May 1993	Sep 2016
CRRC	1766.HK	HKD	Aug 2008	Sep 2016
Fanuc	6954.T	JPY	May 1993	Sep 2016
Emerson	EMR.N	USD	May 1993	Sep 2016
Delta Air	DAL.N	USD	Apr 2007	Sep 2016
Atlas Copco AB	ATCOb.ST	SEK	May 1993	Sep 2016
Relx	REL.L	GBP	May 1993	Sep 2016
Mitsubishi	8058.T	JPY	May 1993	Sep 2016
East Japan Railway	9020.T	JPY	Oct 1993	Sep 2016
Ecolab	ECL.N	USD	May 1993	Sep 2016
Central Japan Railway	9022.T	JPY	Oct 1997	Sep 2016
AP Moeller Maersk A/S	MAERSKa.CO	DKK	May 1993	Sep 2016
Deere & Co	28538H	USD	May 1993	Sep 2016

B Descriptive statistics of portfolio returns

Table (8) summarizes the outcome of the portfolio sorting by presenting the mean returns on five portfolios of luxury goods firms, sorted by their past exposure to the Chinese stock market. Irrespective of the time window to obtain the past sensitivities to the Chinese market return, we observe that portfolios with low exposure to the Chinese market return tend to offer lower average returns than their counterparts with high exposure to the Chinese market. According to the p-values of the bootstrap procedure proposed by Patton and Timmermann (2010) to test monotonicity in asset returns of different portfolio sorts, we reject the null hypothesis that the mean returns of the high and low China exposure portfolios are equal. At best, the p-value reaches 0.09 for the sort based on a rolling regression window of 36 months. It is more difficult to reject the null hypothesis that all pairwise differences between the portfolio returns are equal as the last line in table (8) shows.

However, unlike in traditional asset pricing papers, it is the not the aim of this paper to propose past exposure to the Chinese stock market as a new characteristic to explain average returns. I use the portfolio formation merely to distinguish between stock portfolios of luxury goods firms that reflect high and low exposure to the Chinese stock market to analyze their risk-adjusted excess returns in the form of structural break tests and regression-based analysis.

Table 8: Mean returns (μ) in % per month on portfolios of stocks of luxury firms based on past exposure to Chinese stock market

Panel A: Mean returns (μ) in % per month			
	rolling time window (τ)		
Portfolio:	36	48	60
1 (Low beta)	0.57	0.10	0.13
2	0.63	0.39	0.55
3	0.13	0.79	0.77
4	0.66	0.69	0.48
5 (High beta)	1.22	1.03	1.03
Panel B: Statistical test of differences in mean returns			
p-value ($\mu^{low} = \mu^{high}$)	0.09	0.03	0.06
p-value (pairwise differences, all μ^n)	0.54	0.07	0.14

Notes: Panel A presents the mean return (in % per month) on the portfolios of stocks of luxury goods firms. The portfolio formation is based on the time-varying sensitivity of a firm's stock return to the Chinese stock market return that is obtained from regressions over rolling time windows of 36, 48 and 60 months. Portfolio 1 comprises the firms whose stock returns are in the lowest quintile of sensitivities to the Chinese market return at each point in time. Portfolio 5 comprises their counterparts from the highest quintile of sensitivities to the Chinese market return. Panel B presents the results from tests of equality in the mean returns on the high and low China exposure portfolios in the first row and the pairwise differences between all five portfolios in the second row. The p-values for the null hypothesis of equal mean returns have been obtained after 5000 bootstrap draws and a block length of six months in the block bootstrap using the Matlab code of Patton and Timmermann (2010) to test for monotonicity in asset returns.

C Baseline results with equal-weighted portfolio returns

The main results of this paper are based on value-weighted (weighted by market capitalization) returns on portfolios of luxury goods firms to mitigate the influence of small stocks on the results. In this section, I repeat the structural break tests for risk-adjusted portfolio returns and the regressions on the dummies indicating the month of the announcement of the anti-corruption campaign and the period after the announcement for equal-weighted portfolio returns. To make the results comparable to the evidence presented in the main text, I focus on high and low exposure portfolios formed by sorting into quintiles based on rolling regressions over time windows of 60 months. In a nutshell, it turns out that the weighting of firm returns in the portfolios does not alter the qualitative results.

The results of the structural break test are presented in table (9).

Table 9: Test for structural breaks in risk-adjusted, equal-weighted returns

Panel A: Testing for number of structural breaks				
	UD^{max}	$F(1 \mid 0)$	$F(2 \mid 1)$	$F(3 \mid 2)$
P1 (low)	4.46	4.46	1.39	3.37
P5 (high)	17.46***	17.46***	3.64	2.99
Critical values:				
10%	7.46	7.04	8.51	9.41
5%	8.88	8.58	10.13	11.14
1%	12.37	12.29	13.89	14.80
Panel B: Mean excess returns before and after structural break date				
	Regime 1	Regime 2		Break date (90% CI)
P5 (high)	0.23	-3.31***		Jan 2013
(t-statistic)	(0.44)	(-4.11)		(Feb 2012; Aug 2015)

Refer to the notes to table (1) for details.

Test results related to potential shifts in the level of risk-adjusted returns after the estimated break date and the potential impact of information about the number of senior officials under investigation are presented in table (10) for the portfolio consisting of luxury goods firms with highest sensitivities to the Chinese stock market.

Table 10: Testing for shift in risk-adjusted return of high-beta, equal-weighted portfolio return

Panel A: Impulse and level-shift after break date				
	constant	d^{imp}	d^{step}	
coeff	0.20	8.20***	-3.51	
(t-stat)	(0.39)	(7.44)	(-4.37)	
Panel B: "tigers" vs. "flies"				
	constant	d^{step}	$d^{step} z_t^{tigers}$	$d^{step} z_t^{flies}$
coeff	0.17	-3.40***	-0.65	1.24**
(t-stat)	(0.34)	(-4.01)	(-1.43)	(2.13)

Notes: Refer to the notes of tables (3) and (4) for details.

D Baseline analysis without firms listed on Hong Kong stock exchange

This subsection presents the results from a repetition of the baseline analysis when we disregard all firms traded on the stock exchange of Hong Kong. In the following, I present results based on sorting into quintiles according to sensitivities to the Chinese stock market estimated over rolling time windows of 60 months to make these results comparable with the baseline analysis.

D.1 Structural break test

Table (11) summarizes the results of the Bai and Perron (1998, 2003) test for structural breaks in the risk-adjusted returns on portfolios of luxury goods

firms with and high and low sensitivities to the Chinese stock market return. Firms traded on the Hong Kong stock exchange are excluded from this analysis. Nonetheless, the results of the structural break test are comparable with the baseline results.

There is strong evidence of one structural break in the risk-adjusted excess return on the high exposure portfolio. The break date estimate is May 2013 and thus close to estimated break date in the baseline specification. After the structural break, the risk-adjusted return on the high exposure portfolio was on average significantly negative. Before the structural break, the risk-adjusted return was statistically indistinguishable from zero. These findings do not pertain to the risk-adjusted return on the low exposure portfolio.

Table 11: Structural breaks in risk-adjusted returns?

Panel A: Testing for number of structural breaks				
	UD^{max}	$F(1 \mid 0)$	$F(2 \mid 1)$	$F(3 \mid 2)$
P1 (low)	4.25	4.25	1.01	0.91
P5 (high)	10.72**	10.72**	1.63	2.33
Critical values:				
10%	7.46	7.04	8.51	9.41
5%	8.88	8.58	10.13	11.14
1%	12.37	12.29	13.89	14.80

Panel B: Mean excess returns before and after structural break date			
	Regime 1	Regime 2	Break date (90% CI)
P5 (high)	0.89	-2.79***	May 2013
(t-statistic)	(1.55)	(-2.99)	(April 2012; Feb 2015)

Notes: Refer to the notes in table (1) for details.

D.2 Regressions with dummies

This subsection presents estimates of the impulse and step dummy from the regression in equation (9) for the portfolio consisting of luxury goods firms with the highest sensitivities to the Chinese stock market. The baseline results are presented in table (3). Overall, the results presented in table (12) corroborate the qualitative results.

Table 12: Testing for shift in risk-adjusted return of high- and low-beta portfolio return

portfolio allocation based on time window of							
60 months							
high exposure				low exposure			
	constant	d^{imp}	d^{step}		constant	d^{imp}	d^{step}
coeff	0.92*	2.01*	-3.51***	coeff	-0.67	-4.41***	0.19
(t-stat)	(1.80)	(1.68)	(-3.88)	(t-stat)	(-1.55)	(-4.00)	(0.20)

Notes: Refer to the notes in table (3) for details.

E Descriptive statistics: varying the number of portfolios

Table (13) provides mean returns of low and high China exposure portfolios distinguishing between top and bottom quartile or tercile and additionally varying the length of the time window used to estimate the exposures to the Chinese stock market return for the portfolio allocation. In addition, it provides statistics of a test of whether there are significant differences in the mean returns between the high and low exposure portfolios.

Table 13: Descriptive portfolio statistics for alternative number of portfolios

Quartiles		**Terciles**	
60 months		60 months	
	mean return		mean return
P1 (low)	0.24	P1 (low)	0.33
P4 (high)	0.55	P3 (high)	0.58
p-value ($\mu^{low} = \mu^{high}$)	0.27	p-value ($\mu^{low} = \mu^{high}$)	0.46
48 months		48 months	
P1 (low)	0.33	P1 (low)	0.22
P4 (high)	0.61	P3 (high)	0.93
p-value ($\mu^{low} = \mu^{high}$)	0.28	p-value ($\mu^{low} = \mu^{high}$)	0.02
36 months		36 months	
P1 (low)	0.79	P1 (low)	0.62
P4 (high)	1.01	P3 (high)	0.85
p-value ($\mu^{low} = \mu^{high}$)	0.32	p-value ($\mu^{low} = \mu^{high}$)	0.32

Notes: This table presents the mean return (in % per month) on portfolios of stocks of luxury goods firms. The portfolio formation is based on the time-varying sensitivity of a firm's stock return to the Chinese stock market return that is obtained from regressions over rolling time windows of 36, 48 and 60 months. Portfolio 1 comprises the firms whose stock returns are in the lowest quartile or tercile of sensitivities to the Chinese market return at each point in time. Portfolio 4 (3) comprises their counterparts from the highest quartile (tercile) of sensitivities to the Chinese market return. Below the mean returns, the table presents the results from tests of equality in the mean returns on the high and low China exposure portfolios. The p-values for the null hypothesis of equal mean returns have been obtained after 5000 bootstrap draws and a block length of six months in the block bootstrap using the Matlab code of Patton and Timmemann (2010) to test for monotonicity in asset returns.

F Test of structural breaks in risk-adjusted returns

This section summarizes additional results from tests for structural breaks in the time series of risk-adjusted returns on high and low China exposure portfolios. The results of these additional tests corroborate the evidence presented in the main body of the paper.

F.1 Sorting into quintiles but varying the rolling time window

The results presented in table (14) leave the impression that evidence of a structural break in risk-adjusted returns pertains only to the portfolios consisting of firms with high exposure to the Chinese stock market. This finding is not influenced by the length of the time window of the rolling regressions to calculate the sensitivities to the Chinese stock market return. The estimated break date differs across portfolios but the major announcements and events of the Chinese anti-corruption campaign are well within the confidence interval surrounding the break date estimate.

Table 14: Test for structural breaks in risk-adjusted returns: 48 and 36 months rolling window

36 months				
	UD^{max}	$F(1 \mid 0)$	$F(2 \mid 1)$	$F(3 \mid 2)$
P1 (low)	2.00	2.00	2.57	0.75
P5 (high)	14.21***	14.21***	1.35	3.70
Critical values:				
10%	7.46	7.04	8.51	9.41
5%	8.88	8.58	10.13	11.14
1%	12.37	12.29	13.89	14.80
	Regime 1	Regime 2		Break date (90% CI)
P5 (high)	0.53	-2.70***		May 2013
(t-statistic)	(1.16)	(-3.03)		(Feb 2012; April 2015)

Panel B: 48 months				
	UD^{max}	$F(1 \mid 0)$	$F(2 \mid 1)$	$F(3 \mid 2)$
P1 (low)	4.63	4.63	4.79	0.94
P5 (high)	9.80**	9.80**	4.48	1.20
Critical values:				
10%	7.46	7.04	8.51	9.41
5%	8.88	8.58	10.13	11.14
1%	12.37	12.29	13.89	14.80
	Regime 1	Regime 2		Break date (90% CI)
P5 (high)	1.11*	-1.33**		Sep 2011
(t-statistic)	(1.82)	(-2.10)		(Aug 2009; Nov 2015)

Notes: Refer to the notes in table (1) for details.

F.2 Varying the number of portfolios

I repeat the structural break test for risk-adjusted returns on high and low exposure portfolios of luxury goods firms based on the sorting of firms into

quartiles or terciles and a time window of 60 months to obtain the time-varying sensitivities to the Chinese market return. The results presented in table (15) confirm the main results.

Table 15: Test for structural breaks in risk-adjusted returns: 60 months rolling window but varying number of portfolios

Quartiles				
	UD^{max}	$F(1 \mid 0)$	$F(2 \mid 1)$	$F(3 \mid 2)$
P1 (low)	2.68	2.68	0.99	1.26
P4 (high)	16.73***	16.73***	3.17	1.48
Critical values:				
10%	7.46	7.04	8.51	9.41
5%	8.88	8.58	10.13	11.14
1%	12.37	12.29	13.89	14.80
	Regime 1	Regime 2		Break date (90% CI)
P4 (high)	0.59	-2.69***		June 2013
(t-statistic)	(1.35)	(-3.11)		(Mar 2012; Feb 2015)
Terciles				
	UD^{max}	$F(1 \mid 0)$	$F(2 \mid 1)$	$F(3 \mid 2)$
P1 (low)	3.67	3.67	0.92	0.92
P3 (high)	11.25**	11.25**	2.24	1.91
Critical values:				
10%	7.46	7.04	8.51	9.41
5%	8.88	8.58	10.13	11.14
1%	12.37	12.29	13.89	14.80
	Regime 1	Regime 2		Break date (90% CI)
P3 (high)	0.19	-2.31***		Feb 2013
(t-statistic)	(0.39)	(-3.44)		(Aug 2010; Sep 2016)

Notes: Refer to the notes in table (1) for details.

G Testing for shift in return on high-exposure portfolio returns: varying the number of portfolios and the rolling time window

Table (16) summarizes the results of regressions of excess returns on alternative definitions of portfolios with high exposure to the Chinese stock market on the global risk factors as well as the impulse and step dummies indicating the month of the estimated break date in the baseline specification and the period thereafter. I focus on the portfolio comprising firms with high sensitivities to the Chinese market portfolio because the structural break test of Bai and Perron (1998, 2003) points to a structural break in risk-adjusted returns for the high-exposure portfolio only. There is no such evidence for the portfolio consisting of luxury goods firms with low exposure to the Chinese stock market.

The evidence presented in table (16) points to a significant shift of risk-adjusted returns into negative territory after the baseline break date estimate. By contrast, the risk-adjusted return in the month of the break date tends to be higher than on average. These findings corroborate the baseline results.

Table 16: Testing for shift in risk-adjusted return of high-beta portfolio return

quartiles				**terciles**			
60 months				60 months			
	constant	d^{imp}	d^{step}		constant	d^{imp}	d^{step}
coeff	0.39	2.14*	-3.17***	coeff	0.19	3.08***	-2.44***
(t-stat)	(0.76)	(1.76)	(-3.64)	(t-stat)	(0.41)	(3.39)	(-3.76)
48 months				48 months			
coeff	0.10	0.66	-1.55***	coeff	0.34	0.86	-2.01***
(t-stat)	(0.23)	(0.61)	(-2.61)	(t-stat)	(0.82)	(1.00)	(-3.87)
36 months				36 months			
coeff	0.58	2.53***	-2.00***	coeff	0.31	0.51	-1.53**
(t-stat)	(1.39)	(2.60)	(-2.69)	(t-stat)	(0.78)	(0.58)	(-2.35)

Notes: Refer to the notes in table (3) for details.

H Augmented baseline regressions with narrow definition of "tigers"

This section provides additional results of the assessment of whether there is an additional, marginal impact of the number of senior officials under investigation on risk-adjusted excess returns on portfolios of luxury goods firms. Here, I use a narrower definition of senior officials ("tigers") than in the main text. This robustness check does not fully corroborate the results presented in the main body of the paper. While the signs of the regression coefficients stay the same, their statistical significance deteriorates. Table (17) presents the regression estimates.

Table 17: Testing for shift in risk-adjusted return of high-beta portfolio return with narrow definition of "tigers"

	constant	d^{step}	$d^{step} z_t^{tigers}$	$d^{step} z_t^{flies}$
		60 months		
coeff	1.08**	-3.79***	-1.44	-0.26
(t-stat)	(2.04)	(-3.39)	(-1.58)	(-0.30)
		48 months		
coeff	0.99*	-2.66***	-1.05	-0.44
(t-stat)	(1.81)	(-3.80)	(-1.52)	(-0.50)
		36 months		
coeff	1.12**	-3.15***	-1.26	0.09
(t-stat)	(2.18)	(-4.25)	(-1.24)	(0.07)

Notes: Refer to the notes of table (4) for details of the regressions. The baseline results are based on a broad definition of "tigers", i.e., defining all officials higher than the branch and township level as high-rank official. Here, I use a narrower definition of "tigers" that comprises only officials at provincial and ministerial level and prefecture and department level.

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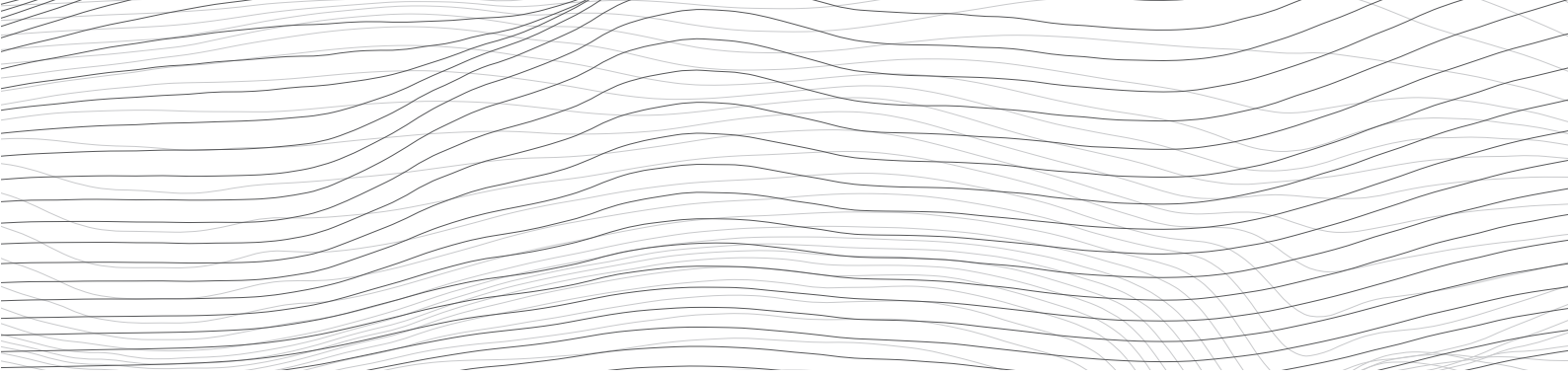

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