

DID THE DODD-FRANK ACT IMPACT PRIVATE FUND PERFORMANCE ? – EVIDENCE FROM
2010 – 2015

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ABSTRACT

Title IV of the Dodd-Frank Act of 2010 introduced the most significant regulatory change in the history of the private fund industry. Attempts to rescind Title IV via the Investment Advisers Modernization Act of 2016 illustrate the highly politically sensitive nature of Dodd-Frank Act registration and disclosure obligations for the private fund industry. To analyze the effect of Title IV on the private fund industry, we use five years of private fund performance data with over 7,000 reporting private funds in a regression discontinuity design. Using multiple hand-selected control groups and several iterations of broad and narrow RD designs and robustness checks, our findings are consistent and do not support the private fund industry's claims that increased supervision and disclosure mandated in the Dodd-Frank Act have a negative effect on private fund earnings.

Keywords: Dodd-Frank Act, Private Funds, Performance, Regression Discontinuity Design

JEL Classification: G23, G24, G28, K22

1. INTRODUCTION

Politician's attempts to rescind Title IV via the Investment Advisers Modernization Act of 2016 (IAMA 2016) illustrate the highly politically sensitive nature of Dodd-Frank Act registration and disclosure obligations for the private fund industry. Primary reasons for political attempts to roll back private fund adviser registration and disclosure obligations in Title IV is the private fund industry's concerns about the effects of compliance costs (Kaal 2016a), the possibility that the SEC may at some point consider making the currently private information collected from private fund advisers in Form PF public, and, most importantly, concerns about the long-term effect of Title IV on private fund adviser returns. This study examines the evidence in a regression discontinuity design.

For the first time since the inception of the private fund industry, Title IV of the Dodd-Frank Act (the Act or Dodd-Frank) and Securities and Exchange Commission (SEC) rules implementing the Act require private fund manager registration and enhanced disclosure of sensitive proprietary information (Dodd-Frank Act § 401, 402, 408). The SEC's rules introduced controversial disclosure obligations that require the reporting of risk metrics, counterparties and credit exposure, strategies and products used by the investment adviser and its funds, performance and changes in performance, financing information, positions held by the investment adviser, percentage of assets traded using algorithms, and the percentage of equity and debt, among others (SEC Form PF 2012, SEC Form ADV 2012). Some estimates suggest that compliance cost will range from \$50,000 to \$400,000 per year (Kaal 2013a and 2015b).

Private fund managers fear that the registration and disclosure requirements under the Dodd-Frank Act could lower their returns (Oesterle 2006, Kaal 2013a, Kaulesar 2012). Kaal (2013a, 2016b) demonstrated in surveys of private fund managers conducted in 2012 and 2015 that a clear majority of private fund managers believed that increased compliance costs negatively affect the industry. However, while Dodd-Frank Act compliance costs affect the profitability of private fund advisers' investment management companies, the majority of private fund manager respondents opined that registration and disclosure requirements under the Dodd-Frank Act do not affect the returns of the private fund industry (Kaal 2013a, 2016b).

Did Congress by enacting Title IV of the Dodd-Frank Act overburden the private fund industry? This study estimates the impact of private fund adviser registration and increased disclosure requirements under the Dodd-Frank Act on private fund performance. We use self-reported Morningstar earnings data for 3,424 private fund advisers that are based in the United States and are subject to the registration and disclosure requirements under Title IV of the Dodd-Frank Act and SEC rules. Our dataset comprises earnings data for private fund advisers from 2010 to 2015. Based on the evidence in multiple RD designs including robustness checks, we conclude that private fund adviser registration and disclosure under the Dodd-Frank Act had no significant effect on private fund adviser returns. This evidence contradicts claims of the private fund industry that private fund adviser registration under the Dodd-Frank Act negatively affects private fund performance.

Part II explains the core aspects of private fund registration and enhanced disclosure requirements under the Dodd-Frank Act and SEC implementation rules and provides a short overview of the literature on private fund performance. Part III

describes our dataset and the empirical methodology. Part IV discusses the motivation for this paper and mechanisms that help explain a possible effect of Title IV on private fund advisers' performance. Part V reports the empirical results of the broad RD design on the impact of Title IV of the Dodd-Frank Act and SEC implementation rules on private fund performance, provides a summary of key findings, and discusses their implications, limitations, and the need for future research. Part VI reports the results of multiple iterations of narrower RD designs and robustness checks including several different hand-selected control groups. Our findings in the broad and narrow RD designs are consistent and do not support the private fund industry's claims that increased supervision and disclosure mandated in the Dodd-Frank Act have a negative effect on private fund earnings. Part VII concludes.

2. PRIVATE FUND ADVISER REGULATION UNDER THE DODD-FRANK ACT

The private fund industry evolved without substantial regulatory oversight (Kaal 2009, Fung and Hsieh 1999). Since the development of the private fund model by Alfred Winslow Jones in the late 1940s (Jones 1949, Loomis 1966, Landau 1968), balancing the interests of private fund managers, investors, and regulators to attain a suitable level of regulatory oversight has proved contentious (Kaal 2013a). The SEC and the private fund industry reached a workable compromise in the mid 1980s, allowing private funds to remain exempt from regulation as long as they complied with accredited investor standards (SEC Regulation D, IA Release No. 2576, IA Release No. 2628) and safe harbor requirements (Kaal 2011 and 2013a).

Following the global financial crisis of 2008-09 the tension between the private fund industry and the regulators increased. Politicians and the media accused private funds for taking undue risks that contributed to the financial crisis (Lee 2009, Economist 2010). Capitalizing on the political support for increased oversight of the private fund industry, legislatures in the United States and Europe enacted new rules intended to address the perceived shortcomings of the global private fund industry (Dodd-Frank Act §§ 401-416, Commission AIF Proposal 2009). In the United States, Congress enacted the Private Fund Investment Advisers Registration Act of 2010 (PFIARA) in Title IV of the Dodd-Frank Act (Dodd-Frank Act §§ 401-416). Title IV was intended to close regulatory gaps, provide greater protections for investors, and curtail speculative trading practices (House of Representatives Joint Explanatory Statement 2010).

Title IV established rules and regulations for the registration of private funds with the SEC and expands the reporting requirements of private advisers to the SEC (Dodd-Frank Act § 408). Title IV of the Dodd-Frank Act exempts private fund advisers with less than \$150 million AUM from registration (Dodd-Frank Act § 408) and requires the SEC to examine factors including the investment strategy, size, and governance of an investment adviser in order to determine the systemic risk of private funds and to impose registration and examination procedures accordingly.

Investment advisers registering with the SEC are required to file the pertinent disclosure document - Form ADV (Form ADV, Sorady 2011, Coakley and Allen 2011, Koehler and Lambert 2011). To implement the new registration requirements under Title IV, the SEC amended Form ADV. On March 30, 2012 investment advisers in the United States, including those who had previously registered with the SEC, had to file the SEC's amendment to Form ADV (Rule 203A-5(b), IA Release 3221), reporting to the

SEC information regarding the private funds they manage (Form ADV Part 1A). The SEC required previously exempt reporting advisers to file the necessary information between January 1 and March 30, 2012 (Rule 203A-5(b), IA Release 3221).

In addition to mandatory registration requirements, amended Form ADV requires disclosure of information regarding the fund structure, ownership, the gross asset value, the investment strategy, the scope of services provided, and the fund's use of consultants and other gatekeepers (Amendments to Form ADV). Amended Form ADV also demands disclosure of non-advisory activities, financial industry affiliations, the number and types of its clients, and an assessment of the percentage of AUM attributable to each client type (Form ADV Part 1A). In addition to the regular annual filing, investment advisers also have to update Form ADV if the disclosures therein become materially inaccurate (Form ADV Part 1A).¹

Form PF filing requirements apply to all registered investment advisers that manage RAUM in excess of \$150 million for private funds at the end of their most recently completed fiscal year (IA Release 3308). Private fund advisers managing less than \$1.5 billion RAUM attributable to private funds must file Form PF annually (IA Release 3308), whereas advisers managing RAUM in excess of \$1.5 billion attributable to private funds must file Form PF quarterly (IA Release 3308). The quarterly reporting requirement for large private fund advisers is intended to provide timely data that enables the FSOC to identify trends in systemic risk (IA Release 3308).

The Investment Adviser Modernization Act of 2016 would exempt smaller private fund advisers and liquidity fund advisers from most of the most burdensome reporting obligations (IAMA 2016). Under the proposed IAMA, smaller hedge fund advisers and smaller liquidity fund advisers would still be required to file Sections 1a (information on investment adviser) and 1b (reporting funds characteristics) of Form PF. However, under the IAMA of 2016, hedge fund advisers with less than \$1.5 billion AUM and liquidity fund adviser under \$1 billion AUM would be excluded from filing Form PF Sections 1c (reporting fund performance), 2a (aggregate information about hedge funds advised by IA), 2b (qualifying HF information – only completed by large advisers), 3 (liquidity funds advised by IA), and 4 (private equity funds advised by IA).

3. PREVIOUS WORK ON PRIVATE FUND PERFORMANCE

Private fund performance has received a lot of attention in the literature. Prior studies have investigated the effects of various variables on private fund performance persistence. Several studies evaluate performance persistence in various contexts, (Fung et al. 2008, Jagannathan et al. 2010, Koh et al. 2003, Liang 2000 and 2003, Naik et al. 2007, Teo 2009, Agarwal and Naik 2000, Agarwal et al. 2006 and 2007, Baquero et al. 2005, Cassar and Gerakos 2009, Ding and Shawky 2007, Eling 2009, Fung and Hsieh

¹ Amended Form ADV obliges advisers to disclose advisory activities, clients, employees, compensation arrangements (IA Release 3221, Form ADV Part 1A). Once advisers file Form ADV they can no longer deduct accrued but unpaid liabilities and other outstanding debt from their totals, because rather than reporting net Regulatory Assets Under Management (RAUM), advisers are required under Amended Form PF to report their gross RAUM (IA Release 3221). Amended Form ADV also curtails investment advisers in their ability to exercise discretion in including or excluding assets from RAUM (Amended Form ADV, Part 1 A, instr. 5.b) and identifying the adviser's total RAUM and the ownership of RAUM by type of client (Form ADV Part 1A Item 5.D.(2)).

1997, 2000, 2001 and 2004), among others. Other studies consider fund regulation and governance in the United States (Hu and Black 2007, Kaal 2013a, 2015b, and forthcoming, Brown et al. 2008, Verret, 2008, Cassar and Gerakos, 2009, 2011), and internationally (Cumming and Dai 2009, 2010a and 2010b, Cumming and Johan 2008).

A significant part of the literature focuses on the performance of private funds in comparison with other market participants. Ackermann, McEnally and Ravenscraft (1999), for instance, find that while private funds are more volatile than mutual funds and market indices, they consistently outperform mutual funds, but not standard market indices. Incentive fees used by private funds may explain some of the higher performance, but cannot explain the increased total risk (Ackermann, McEnally and Ravenscraft 1999). Other studies evaluate the strategies employed by private fund managers and their impact on performance. De Los Rios, Diez and Garcia (2011), for instance, find that only a few private fund strategies provide significant value to investors and not all fund categories exhibit significant nonlinearities. Private fund managers' unique investment strategies are associated with better private fund performance (Sun, Wang and Zheng, 2012). Private fund strategy can also influence private funds' performance persistence (Elgin, 2009).

Absolute and relative performance of private funds is an important factor in the private fund industry. According to Amin and Kat (2003), private funds investments show the best results when 10%-20% of the portfolio value is invested in private funds but do not offer a superior risk-return profile as a stand-alone investment. Among more than three thousand private funds with similar style classification in 2011, Fung and Hsieh (2011) find that less than 20% of long/short equity private funds delivered persistent, significant, and stable positive non-factor related returns for investors. Past performance is associated with risk levels in private funds (Brown, Goetzmann and Park 2001). Absolute and relative performance of private funds is an important factor contributing to fund disappearance (Brown, Goetzmann and Park 2001). Average private fund returns are related positively to fund assets, lockup period, and incentive fees (Liang 1999). Funds performance and skills have been challenged by Lo and Hasanhodzic (2007) and Gramouridis and Paterlini (2010), that show that some private funds strategies can be replicated by combining simple financial tools.

Because private funds evolved in a regulatory environment with low or no regulatory supervision until the enactment of the Dodd-Frank Act, most prior studies on private fund performance do not assess the implications of private fund regulation. Prior studies have explored the impact of earlier attempts by the SEC to register private fund managers and increase disclosure requirements for private funds. In the context of the SEC's attempt in 2004 to register private fund advisers and file Form ADV disclosures (Kaal 2013a), Brown, Goetzmann, Liang and Schwarz (2008) investigate the effect of private fund manager registration on private funds' operational risk. The study concludes that market participants were already aware of operational risk. Cumming and Dai (2010) also analyze the impact of pre Dodd-Frank Act private fund regulation on fund structure and performance. They report that lower fund alphas, lower average monthly returns, and higher fixed fees are associated with the location of key service providers and permissible distributions.

The enactment of Dodd-Frank Act increases significantly regulatory oversight in private fund industry. Our study estimates the causal effect of an exogenous regulatory

shock on private fund performance. More specifically, we estimate the causal effect of private fund manager registration and increased disclosure requirements under Title IV of the Dodd-Frank Act on private fund performance. Other studies investigate other effects of the Dodd-Frank Act. Among others, Dimmock and Gerken (2014) show that the increased regulatory oversight introduced by the Dodd-Frank Act reduces returns misreport by private funds.²

4. MOTIVATION

The paper is motivated by private fund advisers' concerns that increased private fund adviser regulation under Title IV of the Dodd-Frank Act decreases private fund performance. Several mechanisms make it possible that regulation in Title IV of the Dodd-Frank Act decreases performance. First, regulation could decrease performance by increasing compliance costs. Because private fund advisers' monthly performance is reported net of fees, a significant increase in compliance costs could have an immediate effect on monthly performance. Because private fund advisers incur about \$10,000 compliance cost per reporting fund (Kaal 2013a), Dodd-Frank Act compliance costs are highest for those advisers in our dataset with the highest number of reporting funds under management. Second, some private fund advisers have expressed concern that regulation will force them to take on less risk (Kaal 2013a), therefore lowering performance. Third, it is possible that regulation indirectly reduced performance because regulation reduced financing misreporting. Several studies have found that regulation reduces financial misreporting at hedge funds (Dimmock & Gerken 2015, Honigsberg 2015). Several studies have confirmed this effect at public companies—managers usually bias upward when misreporting (CITE). It is possible that similar results apply to private fund advisers, e.g. private fund advisers' performance appeared to decrease because managers were less able to inflate their monthly returns.

5. DATA AND DESCRIPTIVE STATISTICS

To assess the impact of the registration effective date for private fund advisers under the Dodd-Frank Act on the private fund industry, we use data from the Morningstar Private Fund Database, Inc. on monthly private fund earnings (measured in US dollars) reported by about 7,000 private funds and more than 3,700 private fund advisers. Before the mandatory registration requirement for private fund advisers under the Dodd Frank Act, some private fund advisers voluntarily disclosed information about their investment strategies and earnings. After the mandatory registration requirement for private fund advisers under the Dodd Frank Act became effective on March 30, 2012, private fund advisers with AUM above \$150 million are required to comply with increased disclosure obligations. Private fund advisers with less than \$150 million AUM can choose to disclose information to the SEC.

Due to missing data and the presence of outliers, we extract a sample of 3,424 private funds that report all the monthly earnings data and monthly AUM in each period from January 2010 to September 2014. The data set contains information on individual

² The Dodd-Frank Act aims to increase stability of financial markets. See, for example, Kane (2012) and Balasubramnian and Cyree (2014) investigating the effect of Dodd-Frank Act on the stability of financial systems and market discipline on banks.

private fund advisers and their managed funds (SEC identification number, name of the private fund, inception date, domicile) including monthly reported assets under management and monthly reported earnings.

The main descriptive statistics related to the monthly hedge funds returns and the logarithm of the AUM, reported in Table 1. We focus not only on the entire period but also on March 2012, the registration effective date for hedge fund advisers under the Dodd-Frank Act. The average number of funds with AUM larger than \$150 million constitutes 73% of the entire sample of funds. There are minor differences in the reported results between the entire period and March 2012. While the statistics related to the AUM are quite similar in the two considered periods, we notice that the mean performance in March 2012 is below the average of the entire sample period.

Because disclosure under the Dodd-Frank Act is mandatory only for the hedge fund advisers with an AUM exceeding the threshold set at \$150 million, we have divided our sample into two subsamples: the first subsamples includes all hedge funds with AUM always smaller or equal to \$150 million, the second subsample includes all fund with AUM larger than \$150 million. Such subsamples are referred to as "Small" and "Large" respectively.

INSERT TABLE 1

Figures 1 and 2 report the mean values for the hedge fund returns and the AUM (in logarithmic scale) for the two subsamples considered, while Table 2 and 3 display the main descriptive statistics for the entire period and for March 2012. Figure 1 shows that smaller funds outperform larger funds in the sample in eight of twelve months in 2012. There is a strong variability in the performance of the subsamples, with on average no clear dominant group. Figure 2 shows that average AUM is stable across the entire period for both subsamples with slight variation for larger funds in the first quarter of 2012.

INSERT FIGURE 1

INSERT FIGURE 2

Table 2 provides more detailed information on the composition of the two subsamples in the sample period. About 73% of the entire sample of 3,424 hedge funds consists of funds with AUM larger than \$150 million. Only 26% represents the smaller subsample. While the mean return performances are similar for the two subsamples, the standard deviation and the minimum and maximum average performance suggest that the smaller subsample has a larger dispersion. When considering the AUM, both samples are homogeneous and quite stable.

INSERT TABLE 2

INSERT TABLE 3

The statistics for March 2012, shortly before the registration effective date for hedge fund advisers, March 30, 2012, show overall less dispersion. In March 2012, the larger fund subgroup reported a slightly lower standard deviation for Log (AUM) and Returns.

5.1. ESTIMATING THE EFFECT OF ADVISER REGISTRATION ON ADVISER PERFORMANCE – BROAD DESIGN

Our main identification strategy is based on the potential discontinuity generated by the enactment of the Dodd-Frank Act and SEC implementation rules that require private fund advisers with an AUM greater than \$150 million to comply with the registration requirement and file the necessary information between January 1 and March 30, 2012 (Rule 203A-5(b), IA Release 3221).

5.2.1. *Linear Regression*

As a first step, we estimate the parameters of a simple linear regression model, considering the entire sample of 3,424 funds for each period, from December 2011 to December 2012. We want to evaluate the possible presence of a relationship between the funds' returns (Y) and the logarithm of the AUM(X) at time t ($t = \text{Dec 2011, ...Dec 2012}$). As a second step, we introduce a dummy variable, which assumes value equal to 1 if the AUM is larger than \$150 million or 0 otherwise.

Tables 4 and 5 report the results of our investigation. We report the estimated values of the intercept (α), of the beta coefficient of the logarithm of the AUM (β) and of the dummy variable, when present. For each coefficient, we also report the corresponding p-values right below the coefficient. Finally, we report the value of the F-statistics with the corresponding p-value and the R-squared.

When considering the entire sample and no dummy variable, the estimated beta for the logarithm of the AUM are most statistically significant the period January – March 2012, e.g. right before the registration effective date for private fund advisers. We cannot reject the null hypothesis that the beta is equal to zero in the remaining period. The F-statistics also leads us to reject the null hypothesis that the coefficients are jointly equal to zero, supporting the validity of the model.

Examining the beta coefficients, we notice that in the period January - March 2012 and July 2012, beta coefficients are negative, while immediately after the registration effective date, e.g. April-May 2012 the beta coefficient is positive. In the period before the registration effective date for hedge fund advisers under the Dodd-Frank Act, e.g. March 2012, the size of funds seems to have a negative relationship with the fund performance, and a positive relationship thereafter. We conclude that size of the funds in our sample does not appear to matter for fund returns as only a few coefficients are statistically significant but are still close to zero.

INSERT TABLE 4

The simple linear regression models in Table 5 also include a dummy variable, with value equal to 1 for funds with AUM larger than \$150 million and 0 otherwise. Right before the registration effective date, in January and February 2012, the dummy

variable results are not statistically significant and negative. The dummy variables are statistically significant and positive in April and September 2012. The F-statistics support the validity of the models, while the explanatory power, measured by the R-squared is still very limited. The Beta coefficients are all close to zero and at 5%. We reject the null hypothesis that the beta coefficients are statistically different from zero only for a few months.

The empirical results from the simple regression analysis, including the dummy analysis, seem to suggest that close to the registration effective date for hedge fund advisers under the Dodd-Frank Act, the size of AUM, above or below the regulatory threshold of \$150 million, does not play a significant role in explaining hedge fund returns of the entire sample.

INSERT TABLE 5

5.2.2. *Regression Discontinuity*

Our empirical methodology is based on a regression discontinuity design, using the Rubin Causal Model (RCM) (Rubin 1974, Imbens and Rubin 2007, Imbens and Wooldridge 2007). The regression discontinuity design allows us to examine the causal effect of a binary treatment of units (which may be individuals, firms, or other entities), that may have been exposed or may not have been exposed to a specific treatment.³ In our analysis, the unit of observation is a specific private fund before and after the treatment, represented by the registration effective date for private fund advisers under the Dodd-Frank Act, March 30, 2012. Additionally, the treatment may affect the units, each private fund adviser in our sample, in a heterogeneous way, which needs to be controlled for.

In the following, we use the Sharp Regression Discontinuity (SRD) design (Trochim 1984 and 2001, Imbens and Kalyanaraman 2011). Our analysis has been performed in STATA, using the code described in Fuji, Imbens and Kalyanaraman (2009) and the STATA packages **rd** (Nichols 2007) and **rdrobust** (Calonico et al. 2013).

In the SRD design, the assignment of units to the treatment group is governed by the variable W_i , defined as a deterministic function of the forcing (or treatment-determining) variable X and the fixed threshold c , and takes the following value:

$$W_i = \begin{cases} 1 & \text{if } X_i > c \\ 0 & \text{otherwise} \end{cases}$$

All units with a value of X_i at least equal to c are assigned to the treatment group. On the contrary, all units with a covariate value less than c are assigned to the control group (and are not eligible for the treatment). The basic idea behind the RD design is that any discontinuity in the conditional distribution of Y_i as a function of X_i at the cutoff value c is interpreted as evidence of a causal effect of the treatment.

In the context described here, the registration of the private fund advisers under

³ The RD methodology has been applied widely in the law and economics literature in order to identify the effect on an exogenous change in legislation. See Carpenter and Dobkin (2009), Black et al. (2012) and MacDonald et al. (2015) among others.

the Dodd-Frank Act is the treatment. The Dodd-Frank Act requires a private fund adviser to be registered if the AUM exceeds \$150 million after March 30, 2012, the registration effective date. Private fund advisers are assigned to the treatment group only when these two conditions are met. The outcome variable Y_i is the private fund advisers' returns in each period of the sample, after the registration effective date for private fund advisers under the Dodd-Frank Act. The forcing variable X_i is the log AUM of each private fund adviser i , with the threshold c set equal to \$150 million, which has been re-scaled to zero in the following figures.

We apply the data-driven optimal choice of evenly-spaced bins in Calonico et al. (2013). The procedure aims to use bins to approximate the underlying regression functions by local sample means. The optimal solutions provided by their approach would suggest the partition of our data into seven bins, which is too small. Hence, we increased the optimal number of bins by a factor of 20 and 100 to obtain a plot showing a cloud of points as shown in Figure 5 below. We notice that the variability on the returns (y-axis) is larger for the funds with large AUM and as we increase the number of bins, the regression function clearly gets smoother. However, the presence of discontinuity is evident, no matter what number of bins we consider.

Under a SRD approach, following Imbens and Kalyanaraman (2012), we focus on the estimation of the average effect of the treatment for units with covariate values equal to the threshold, denoted with coefficient τ_{RD} . We perform the regression on the entire sample from January 2010 to August 2014.

We have extended our analysis using a Fuzzy Regression Discontinuity (FRD) approach on the entire sample. FRD design allows us to model the probability of receiving the treatment (compliance with mandatory information disclosure) as a smaller jump at the threshold (i.e. lower than 1), rather than a sharp change from 0 to 1 as in the SRD design. FRD allows us to check whether the discontinuity has occurred in a period different from March 30, 2012. The reason for implementing FRD is that hedge fund advisers may have anticipated the costs of compliance with mandatory disclosure in the months preceding the enactment of the Dodd Frank Act. However, because the denominator is very close to 1 in our investigation, empirical results show that the differences between the SRD and the FRD approach are of minor importance. Our estimates are computed in correspondence of the optimal bandwidth. As a robustness check, we computed such estimates when considering different bandwidths.

Using an array of robustness tests validating our RD results, Figures 3-7 suggest that the requirements introduced by the Dodd-Frank Act create no significant effect on private fund performance. The P-values for all RD results in Table 6 are above the 5% level and confirm our finding of no effect. By contrast, the private fund industry expected the introduction of the Dodd-Frank Act to result in negative effects on private fund returns. The absence of any statistical significant effect of mandatory disclosure on hedge fund returns may suggest that the transparency costs associated with disclosure do not significantly affect the profitability of hedge fund advisers.

INSERT FIGURE 3

INSERT FIGURE 4

INSERT TABLE 6

INSERT FIGURE 5

INSERT FIGURE 6

INSERT FIGURE 7

6. NARROWER RD DESIGN

While providing valuable general guidance on the effects of Title IV on private fund adviser performance, the RD analysis based on only one point in time (registration effective date March 30, 2012) in Part IV can be improved. First, private fund advisers could—and did—register before the March 30, 2012 deadline. And even those that did not register until the deadline may have made internal changes before the deadline. Second, many private fund advisers close to our threshold of \$150 million AUM were able to choose whether to register as a RIA or ERA. Third, private fund advisers could theoretically manage AUM in advance of the deadline. Fourth, the self-reported assets under management numbers in Morningstar are not calculated the same way as the RAUM calculation required by the SEC.

To remedy these shortcomings and to overcome several assumptions necessary for the empirical analysis of the full sample in Part IV we use a tighter RD design. We run the RD analysis using different timeframes. In particular, we use varying window lengths (e.g., one year before and after, two years before and after, etc.) to determine if our results are consistent. To alleviate possible concerns about the assignment of firms to the treatment and control groups, we obtained each firm's actual registration history from the SEC's IAPD website and through historical Form ADV data. We combine this data with variables that are already available in the Morningstar dataset to create tighter control samples and create two additional control groups of exempt reporting advisers (ERAs): (1) only firms that were already registered and had no change in status, and (2) foreign firms that are completely unaffected by the US legal regime.

We differentiate between US and non-US firms because it affects the registration requirements. US advisers are generally eligible to be an ERA if they (1) advise only private funds, and (2) advise funds with a total of less than \$150M in assets under management. Non-US advisers, on the other hand, are generally eligible to be an ERA if (1) the US clients are private funds, and (2) assets under management from the US are less than \$150M. [We also use propensity score matching to create a matched sample of firms with comparable returns before the Act went into effect and then run difference-in-differences tests using the matched sample.]

Appendix A contains the descriptive statistics and RD results of our tighter RD designs analysis. The tighter RD designs analysis confirm our finding of no effect in the broader design in Part IV above.

7. DISCUSSION & FUTURE RESEARCH

For much of its history, the private fund industry has viewed private fund adviser registration and the disclosure of proprietary information as a threat to its profitability. Regulators have attempted for decades to increase the monitoring and supervision of the private fund industry. Ending the struggle between the industry and regulators, Title IV of the Dodd-Frank Act introduced a mandatory registration and disclosure requirement for private fund managers.

Prior studies have demonstrated that mandatory private fund adviser registration under the Dodd-Frank Act affects the cost structure of the industry. Kaal collected data on private fund managers, showing that registration and increased compliance requirements under the Dodd-Frank Act marginally increase the cost structure of private funds (Kaal 2013a, 2015b, 2015c, 2016). Kaal (2013a, 2015c) finds non-robust evidence that the higher administrative costs imposed by the Dodd-Frank Act are a second-order effect of the regulation, thereby not affecting the overall returns of private funds. We are not aware of any other empirical evidence on the effects of the Dodd-Frank Act on the private fund industry. Compared with the existing prior work, in this study, we use a much larger dataset and a more sophisticated empirical approach such as regression discontinuity. We find no statistical evidence for an effect of the requirements introduced by the Dodd-Frank Act on private fund advisers' performance.

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APPENDIX

TABLES

TABLE 1

Variable	Average Value	March 2012
Number of funds ≤150 mil	920	920
Funds with AUM>150 mil	2502	2502
RETURNS		
Min	-26.12	-15.99
Mean	0.68	0.57
Max	55.34	33.77
Std	3.94	3.45
LOG (AUM)		
Min	9.21	9.21
Mean	17.07	17.08
Max	23.87	23.84
Std	1.90	1.89

Table 1 – *Descriptive Statistics on the Entire Sample, January-December 2012*

TABLE 2

Variable	Fund AUM ≤150 mil	Fund AUM >150 mil
Number of Funds	920	2502
RETURNS		
Min	-26.12	-13.78
Mean	0.71	0.64
Max	54.26	24.16
Std	4.35	3.09
LOG (AUM)		
Min	9.21	11.71
Mean	16.56	19.15
Max	19.46	23.87
Std	1.56	1.67

Table 2 – *Descriptive Statistics Average Values for Large and Small Subsamples, January-December 2012*

TABLE 3

Variable	Fund AUM ≤150 mil	Fund AUM >150 mil
Number of Funds	920	2502
RETURNS		
Min	-15.99	-12.18
Mean	0.54	0.61
Max	27.21	33.77
Std	3.55	3.27
LOG (AUM)		
Min	9.21	18.83
Mean	16.54	19.73
Max	18.82	23.84
Std	1.56	0.77

Table 3 – *Descriptive Statistics Small and Large Subsamples, March 2012*

TABLE 4

Regression Statistics Linear Model (Dec 2011 to Dec 2012)													
	Dec 2011	Jan 2012	Feb 2012	Mar 2012	Apr 2012	May 2012	Jun 2012	Jul 2012	Aug 2012	Sept 2012	Oct 2012	Nov 2012	Dec 2012
pha	-0.2157185 (0.832)	9.857041*** (0)	2.779961*** (0.001)	2.117204** (0.024)	-1.092872 (0.153)	-5.167892*** (0.002)	2.073734* (0.057)	1.318737 (0.468)	3.762679*** (0.00)	0.339569 (0.694)	-2.184016*** (0.014)	-1.434683 (0.14)	1.504 (0.1)
ta	0.00324 (0.956)	-0.4049383*** (0)	-0.0489703 (0.305)	-0.093604* (0.085)	0.0454055 (0.307)	0.1906136** (0.046)	-0.0929947* (0.141)	-0.0152903 (0.885)	-0.1432312*** (0.004)	0.0507516 (0.312)	0.0988003* (0.057)	0.0905855 (0.109)	-0.008 (0.8)
Stat	0.00 (0.9563)	13.36*** (0.0003)	1.05 (0.3046)	2.97* (0.0851)	1.04 (0.307)	4** (0.0457)	2.17 (0.1414)	0.02 (0.885)	8.28*** (0.0041)	1.02 (0.3117)	3.64* (0.0567)	2.58 (0.1088)	0.0 (0.89)
Squared	0.00	0.012	0.001	0.0027	0.001	0.0037	0.002	0.00	0.0078	0.001	0.0036	0.0026	0.0

Table 4 - Regression statistics for a linear model in the periods December 2011 through December 2012. P-values are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 10% level or better) are shown in **boldface**.

TABLE 5

Regression Statistics Linear Model with Dummy (Dec 2011 to Dec 2012)													
	Dec 2011	Jan 2012	Feb 2012	Mar 2012	Apr 2012	May 2012	Jun 2012	Jul 2012	Aug 2012	Sept 2012	Oct 2012	Nov 2012	D 20
aha	0.0614465 (0.957)	9.618512*** (0.000)	2.391477** (0.015)	2.470767** (0.035)	0.1809835 (0.845)	-5.616524*** (0.004)	0.6660763 (0.594)	1.558515 (0.452)	3.871995*** (0.00)	-0.6925546 (0.475)	-2.064664** (0.042)	-1.541117 (0.159)	0.843 (0.0)
a	-0.0151869 (0.825)	-.3894468*** (0.004)	-0.0239626 (0.684)	-0.1160514* (0.098)	-0.0361457 (0.515)	0.2196748* (0.059)	-0.001148 (0.988)	-0.0310213 (0.803)	-0.1504024*** (0.01)	0.1188031** (0.041)	0.0909656 (0.134)	0.0976125 (0.136)	0.03 (0.6)
nmy	0.1657301 (0.599)	-.1299044 (0.841)	-0.2068031 (0.47)	0.1779477 (0.613)	0.6696762** (0.015)	-0.2454423 (0.661)	-0.7997703** (0.024)	0.1412264 (0.809)	0.0649386 (0.813)	-0.6365251** (0.021)	0.0715396 (0.803)	-0.0650892 (0.832)	-0.39 (0.2)
tat	0.14 (0.8697)	6.70*** (0.0013)	0.79 (0.4548)	1.61 (0.1999)	3.49** (0.0308)	2.1 (0.1235)	3.65** (0.0264)	0.04 (0.9611)	4.16** (0.0158)	3.19** (0.0417)	1.85 (0.1579)	1.31 (0.2704)	0.1 (0.4)
quared	0.0003	0.0120	0.0014	0.0029	0.0064	0.0038	0.0067	0.0001	0.0079	0.0061	0.0036	0.0026	0.0

Table 5 - Regression statistics for a linear model with dummy variable in the periods December 2011 through December 2012. P-values are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% levels. Significant results (at 10% level or better) are shown in **boldface**.

TABLE 6

	Measure	Coef.	P-Value
Entire Sample	Conventional RD	0.95106	0.118
	Bias-corrected RD	1.1581	0.057
	Robust RD	1.1581	0.098
Mar-12	Conventional RD	0.95106	0.118
	Robust RD	N/A	0.098
	Robust with Cross Validation	N/A	0.104
	Optimal Bandwidth 1.2006146	0.8884178	0.107
	Bandwidth 0.30015365	0.9475949	0.363
	Bandwidth 0.60030731	0.4632891	0.566
	Bandwidth 0.90046096	0.8731405	0.178
	Bandwidth 1.5007683	0.6539375	0.184
	Bandwidth 1.8009219	0.4522598	0.319
	Bandwidth 2.1010756	0.2725607	0.521
	Bandwidth 2.4012292	0.1864635	0.644
	Optimal BW Feb. 2012 Return as Data	0.0565339	0.915
	Optimal BW Jan. 2012 Return as Data	0.2624185	0.733
	Optimal BW Dec. 2011 Return as Data	0.2087388	0.656
	Optimal BW Feb. 2012 Return as X	0.0565339	0.915
	Optimal BW Jan. 2012 Return as X	0.2624185	0.733
	Optimal BW Dec. 2011 Return as X	0.2087388	0.656
	Optimal BW Apr. 2012 Return as X	0.6087372	0.221
	Optimal BW May 2012 Return as X	-2.655924	0.039
	Optimal BW Jun. 2012 Return as X	0.1311312	0.861

Table 6 - Regression Discontinuity Coefficients and P-Values for entire sample and in March 2012 with bandwidth (BW) changes. *, **, and * significance at 10%, 5%, and 1% levels. Significant results (at 10% level or better) are shown in **boldface**.**

FIGURES

FIGURE 1

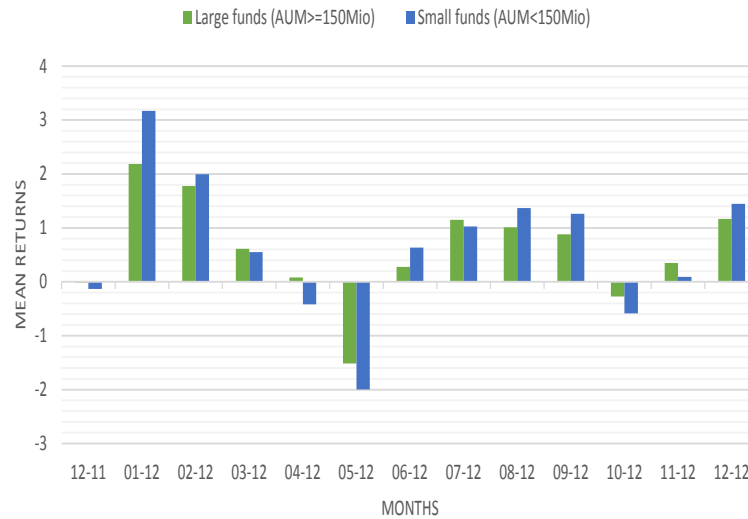


Figure 1 – Average Mean Hedge Fund Returns, January-December 2012

FIGURE 2

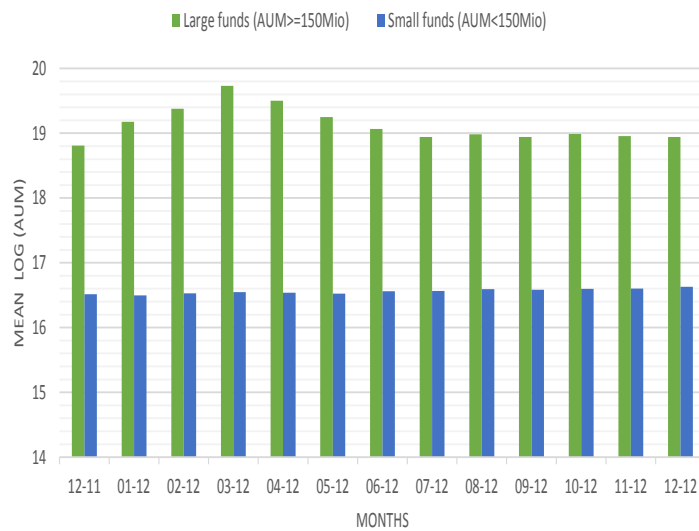


Figure 2 – Mean Hedge Fund Logarithm AUM, January-December 2012

FIGURE 3

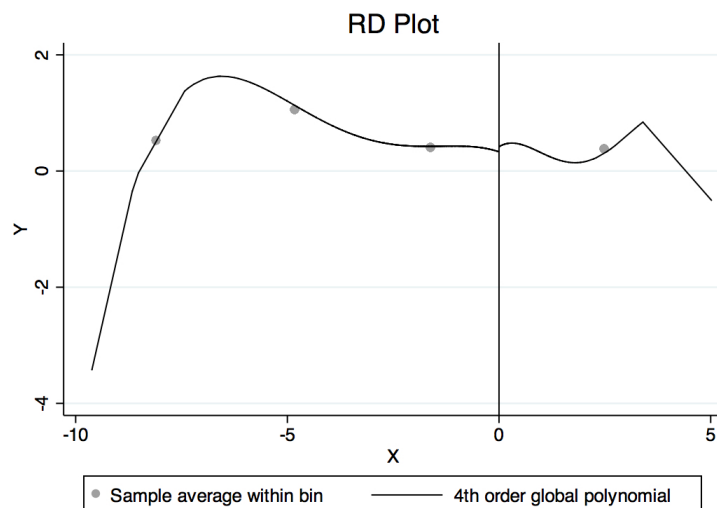


Figure 3 –RD plot using scaled down optimal bin-length choice relative to the entire sample of [2145] funds in March 2012. X-axis: logarithm of the (AUM) after subtracting the threshold of $\log(150\text{mil})$, y-axis: log-returns in March 2012

FIGURE 4

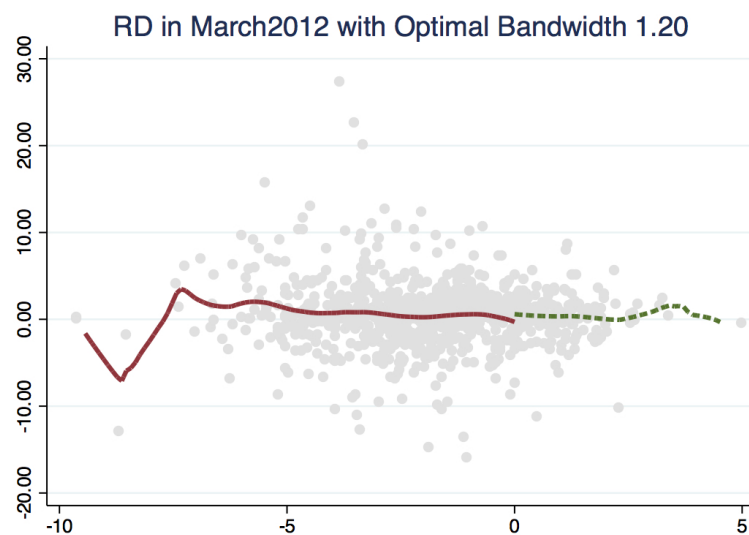


Figure 4 – SRD graph for registration effective date March 30, 2012. Figure 8 illustrates the discontinuity effect on private fund earnings that occurred on the registration effective date, March 30, 2012.

FIGURE 5

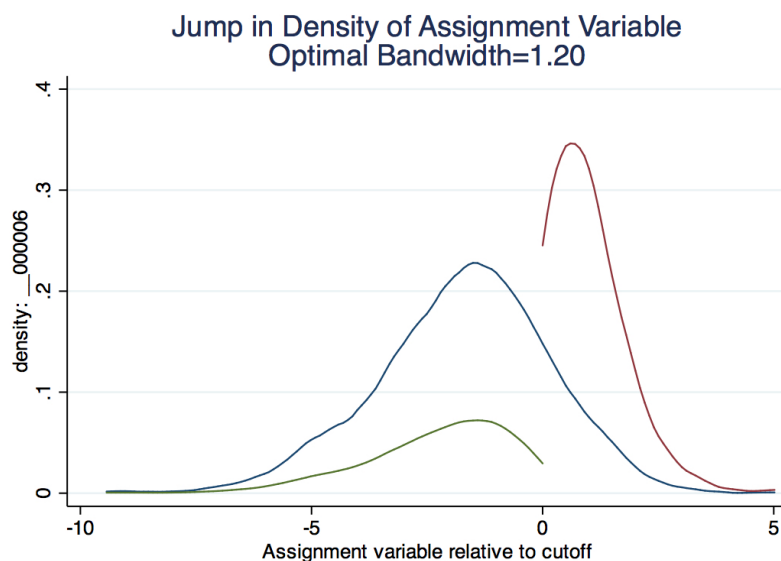


Figure 5 – *Jump in density of Assignment Variable for registration effective date March 30, 2012.* Figure 5 reports the results obtained by using the density test proposed by McCrary (2008). The results reported in Figure 5 support the presence of a discontinuity in March 2012 at the threshold of 150 million.

FIGURE 6

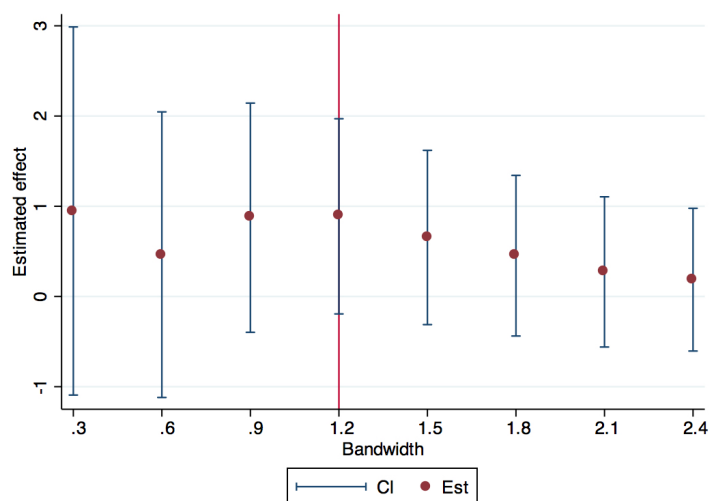


Figure 6 – *Confidence intervals for the estimated effect in March 30, 2012 when different bandwidths are applied.* Figure 6 shows that the estimates are statistically significant and rather stable also for larger bandwidths.

FIGURE 7

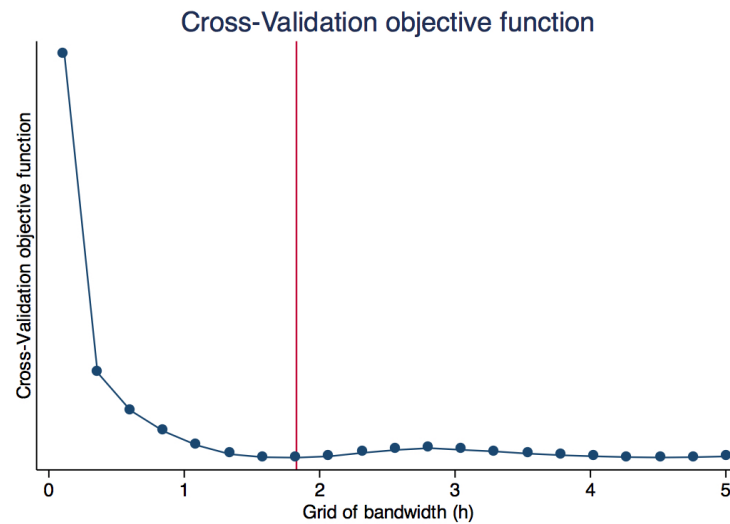
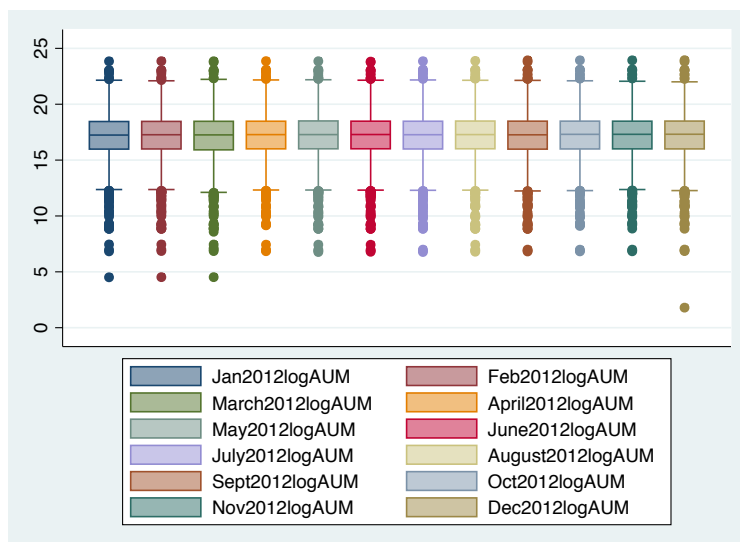
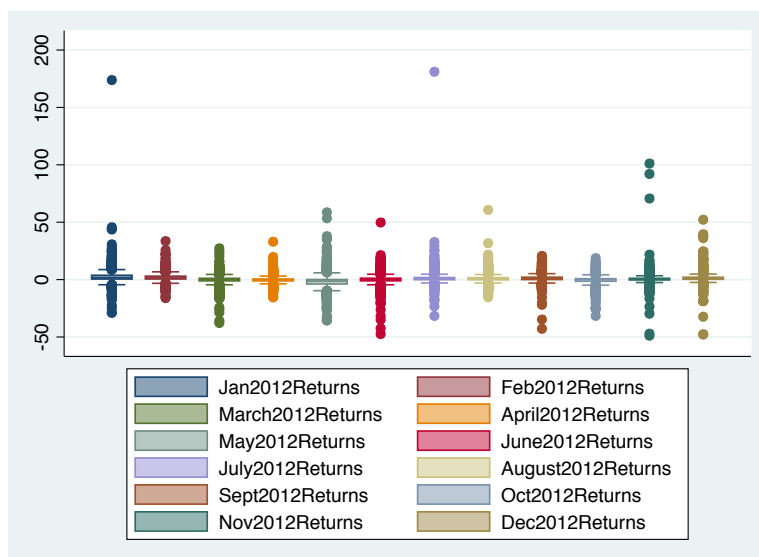


Figure 7 – *Confidence intervals for the estimated effect in March 30, 2012 for different bandwidths.* Figure 7 shows that the optimally chosen bandwidth is very close to the value that cross-validation would select, as implemented by Calonico et al. (2013), supporting the validity of the results. Increasing the bandwidth size does not dramatically affect our estimates.

Appendix A

Descriptive Statistics



REGRESSION WITH SEC DUMMY – NEW VARIABLE AND ALSO THE OTHER DUMMY FROM NEW CONTROL GROUP

```
. reg March2012Returns FlagSECMarch2012
```

Source	SS	df	MS	Number of obs = 2803	
				F(1, 2801) = 0.00	
Model	1.3511e-07	1	1.3511e-07	Prob > F = 0.9999	
Residual	32365.1284	2801	11.5548477	R-squared = 0.0000	
				Adj R-squared = -0.0004	
Total	32365.1284	2802	11.5507239	Root MSE = 3.3992	

```

-----
March2012Returns |   Coef.  Std. Err.   t   P>|t|   [95% Conf. Interval]
-----+-----
FlagSECMarch2012 | -.0000152   .140294   -0.00   1.000   -.2751053   .2750749
   _cons | -.1407685   .0766638   -1.84   0.066   -.2910917   .0095547
-----

```

```
. reg March2012Returns March2012logAUM FlagSECMarch2012
```

```

-----
Source |      SS      df    MS                Number of obs =   2388
-----+-----
Model |  8.83648144    2  4.41824072            F( 2, 2385) =   0.36
Residual | 29275.9637  2385 12.2750372            Prob > F   =  0.6978
-----+-----
Total | 29284.8002  2387 12.2684542            R-squared   =  0.0003
                                           Adj R-squared = -0.0005
                                           Root MSE    =  3.5036
-----

```

```

-----
March2012Returns |   Coef.  Std. Err.   t   P>|t|   [95% Conf. Interval]
-----+-----
March2012logAUM | .0249416   .0360337    0.69   0.489   -.0457189   .0956021
FlagSECMarch2012 | .051954   .1603251    0.32   0.746   -.262437   .366345
   _cons | -.5278595   .6136888   -0.86   0.390   -1.731278   .6755592
-----

```

```
. reg March2012Returns March2012logAUM FlagSECMarch2012 LargeAUMAdvisorIdx
```

```

-----
Source |      SS      df    MS                Number of obs =   2388
-----+-----
Model |  53.2493665    3 17.7497888            F( 3, 2384) =   1.45
Residual | 29231.5508  2384 12.2615566            Prob > F   =  0.2270
-----+-----
Total | 29284.8002  2387 12.2684542            R-squared   =  0.0018
                                           Adj R-squared =  0.0006
                                           Root MSE    =  3.5017
-----

```

```

-----
March2012Returns |   Coef.  Std. Err.   t   P>|t|   [95% Conf. Interval]
-----+-----
March2012logAUM | .0627157   .041121    1.53   0.127   -.0179208   .1433523
FlagSECMarch2012 | .0936416   .1617273    0.58   0.563   -.223499   .4107822
LargeAUMAdvisorIdx | -.3427851   .180111   -1.90   0.057   -.6959756   .0104053
   _cons | -.9555922   .6532311   -1.46   0.144   -2.236552   .3253675
-----

```

```
. reg March2012Returns March2012logAUM FlagSECMarch2012 ControlGroup3EUExemptNon
ControlGroupop1USExemptNo
```

```

-----
Source |      SS      df    MS                Number of obs =   2388
-----+-----
Model |  34.1027672    4  8.5256918            F( 4, 2383) =   0.69
Residual | 29250.6974  2383 12.2747367            Prob > F   =  0.5957
-----+-----
Total | 29284.8002  2387 12.2684542            R-squared   =  0.0012
                                           Adj R-squared = -0.0005
                                           Root MSE    =  3.5035
-----

```

```

-----
March2012Returns |   Coef.  Std. Err.   t   P>|t|   [95% Conf. Interval]
-----+-----
March2012logAUM | .0250483   .0360624    0.69   0.487   -.0456687   .0957652
-----

```

```

FlagSECMarch2012 | .0616322 .1605213 0.38 0.701 -.2531437 .3764081
ControlGroup3EUExemptNon | .5517734 1.755218 0.31 0.753 -2.890139 3.993686
ControlGroup1USExemptNo | .8614592 .6146481 1.40 0.161 -.343841 2.06676
_cons | -.5454332 .6142172 -0.89 0.375 -1.749889 .6590221
-----

```

```

. reg March2012Returns March2012logAUM LargeAUMAdvisorIdx FlagSECMarch2012
ControlGroup3EUExemptNon ControlGroup1USE
> xemptNo LargeAUMAdvisorIdx
note: LargeAUMAdvisorIdx omitted because of collinearity

```

```

Source | SS df MS Number of obs = 2388
-----+----- F( 5, 2382) = 1.21
Model | 74.0748392 5 14.8149678 Prob > F = 0.3027
Residual | 29210.7254 2382 12.2631089 R-squared = 0.0025
-----+----- Adj R-squared = 0.0004
Total | 29284.8002 2387 12.2684542 Root MSE = 3.5019

```

```

-----
March2012Returns | Coef. Std. Err. t P>|t| [95% Conf. Interval]
-----+-----
March2012logAUM | .0608983 .0411529 1.48 0.139 -.0198009 .1415976
LargeAUMAdvisorIdx | -.3262446 .180703 -1.81 0.071 -.6805961 .0281068
FlagSECMarch2012 | .1006971 .1618977 0.62 0.534 -.2167779 .4181721
ControlGroup3EUExemptNon | .6099425 1.754683 0.35 0.728 -2.83092 4.050805
ControlGroup1USExemptNo | .7748045 .6162289 1.26 0.209 -.433596 1.983205
LargeAUMAdvisorIdx | 0 (omitted)
_cons | -.9495024 .6534492 -1.45 0.146 -2.23089 .3318857
-----

```

```

*****/
/*** REGRESSION DISCONTINUITY USING AUM AS THRESHOLD
/*****/

```

```

. rd March2012Returns zMarch2012,gr mbw(25( 25) 200) bdep ox line
Two variables specified; treatment is
assumed to jump from zero to one at Z=0.

```

Assignment variable Z is zMarch2012
Treatment variable X_T unspecified
Outcome variable y is March2012Returns

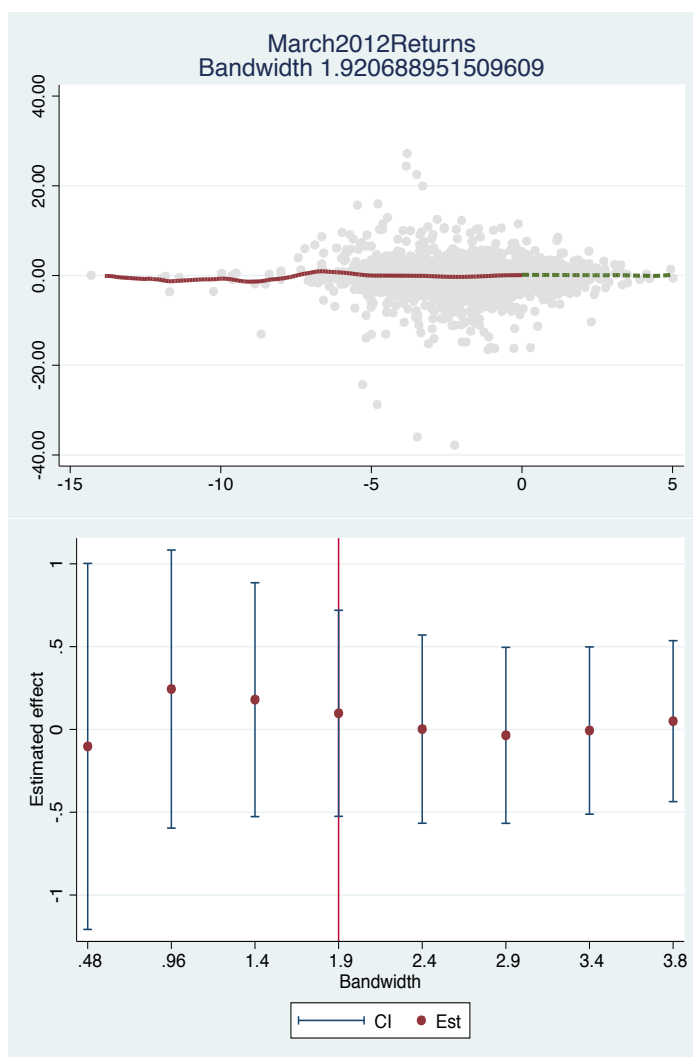
```

Command used for graph: lpoly; Kernel used: triangle (default)
Bandwidth: 1.920689; loc Wald Estimate: .09736636
Bandwidth: .48017224; loc Wald Estimate: -.10256855
Bandwidth: .96034448; loc Wald Estimate: .24369998
Bandwidth: 1.4405167; loc Wald Estimate: .17967532
Bandwidth: 2.4008612; loc Wald Estimate: .00191639
Bandwidth: 2.8810334; loc Wald Estimate: -.03558873
Bandwidth: 3.3612057; loc Wald Estimate: -.00664957
Bandwidth: 3.8413779; loc Wald Estimate: .05005124
(11441 missing values generated)
(11441 missing values generated)
(11441 missing values generated)
Estimating for bandwidth 1.920688951509609

```

Estimating for bandwidth .4801722378774023
 Estimating for bandwidth .9603444757548045
 Estimating for bandwidth 1.440516713632207
 Estimating for bandwidth 2.400861189387011
 Estimating for bandwidth 2.881033427264414
 Estimating for bandwidth 3.361205665141816
 Estimating for bandwidth 3.841377903019218

March2012R~s	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lwald	.0973664	.3174192	0.31	0.759	-.5247639	.7194966
lwald25	-.1025685	.5638638	-0.18	0.856	-1.207721	1.002584
lwald50	.2437	.4282994	0.57	0.569	-.5957515	1.083151
lwald75	.1796753	.3603351	0.50	0.618	-.5265685	.8859191
lwald125	.0019164	.2899671	0.01	0.995	-.5664087	.5702415
lwald150	-.0355887	.2711084	-0.13	0.896	-.5669514	.4957739
lwald175	-.0066496	.2576891	-0.03	0.979	-.5117109	.4984118
lwald200	.0500512	.2479353	0.20	0.840	-.4358931	.5359956

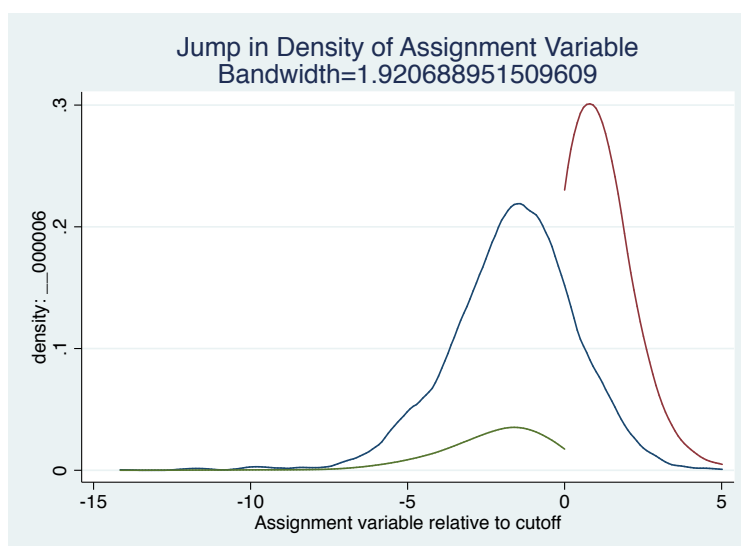


. rd March2012Returns zMarch2012, gr ddens

Two variables specified; treatment is assumed to jump from zero to one at $Z=0$.

Assignment variable Z is zMarch2012
Treatment variable X_T unspecified
Outcome variable y is March2012Returns

Command used for graph: lpoly; Kernel used: triangle (default)
Bandwidth: 1.920689; loc Wald Estimate: .09736636
Bandwidth: .96034448; loc Wald Estimate: .24369998
Bandwidth: 3.8413779; loc Wald Estimate: .05005124
(11441 missing values generated)
(11441 missing values generated)
(11441 missing values generated)
Estimating for bandwidth 1.920688951509609
Estimating for bandwidth .9603444757548045
Estimating for bandwidth 3.84137790301921



REGRESSION DISCONTINUITY USING 1000000 FOR AUM.

rd March2012Returns zMarch2012small ,gr mbw(25(25) 200) bdep ox line

Two variables specified; treatment is assumed to jump from zero to one at $Z=0$.

Assignment variable Z is zMarch2012small
Treatment variable X_T unspecified
Outcome variable y is March2012Returns

Command used for graph: lpoly; Kernel used: triangle (default)
Bandwidth: 2.1437308; loc Wald Estimate: -.33885608
Bandwidth: .53593271; loc Wald Estimate: -.17393003
Bandwidth: 1.0718654; loc Wald Estimate: -.26104135
Bandwidth: 1.6077981; loc Wald Estimate: -.25790883
Bandwidth: 2.6796635; loc Wald Estimate: -.28630371
Bandwidth: 3.2155962; loc Wald Estimate: -.15787622
Bandwidth: 3.751529; loc Wald Estimate: -.06577484

Bandwidth: 4.2874617; loc Wald Estimate: -.00429858

(11441 missing values generated)

(11441 missing values generated)

(11441 missing values generated)

Estimating for bandwidth 2.143730829204079

Estimating for bandwidth .5359327073010197

Estimating for bandwidth 1.071865414602039

Estimating for bandwidth 1.607798121903059

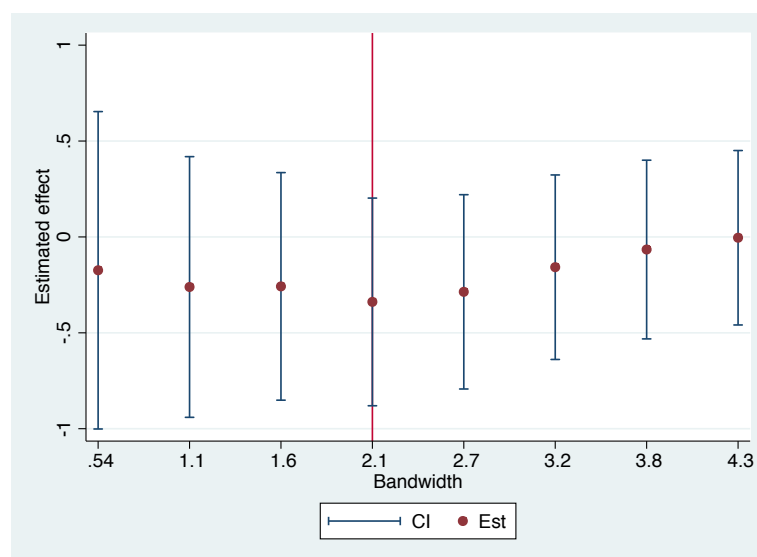
Estimating for bandwidth 2.679663536505099

Estimating for bandwidth 3.215596243806118

Estimating for bandwidth 3.751528951107138

Estimating for bandwidth 4.287461658408158

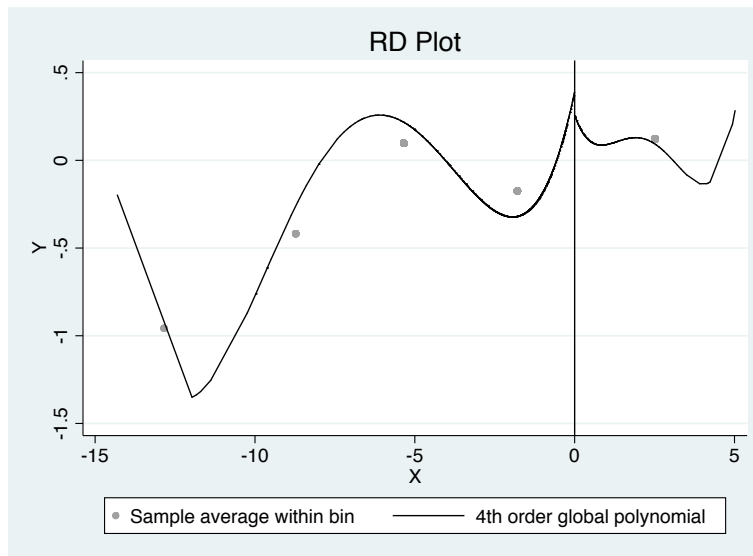
March2012R~s	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lwald	-.3388561	.2762399	-1.23	0.220	-.8802763	.2025642
lwald25	-.17393	.4222031	-0.41	0.680	-1.001433	.6535728
lwald50	-.2610414	.3467698	-0.75	0.452	-.9406977	.418615
lwald75	-.2579088	.3026958	-0.85	0.394	-.8511818	.3353641
lwald125	-.2863037	.2584619	-1.11	0.268	-.7928797	.2202722
lwald150	-.1578762	.2454469	-0.64	0.520	-.6389434	.3231909
lwald175	-.0657748	.2376815	-0.28	0.782	-.531622	.4000723
lwald200	-.0042986	.2320369	-0.02	0.985	-.4590825	.4504854



```
. rdbinselect March2012Returns zMarch2012, graph_options(title(RD Plot) ytitle(Y) xtitle(X))
```

Number of bins for RD estimates - Method: Evenly spaced

Cutoff c = 0	Left of c	Right of c
Number of obs	1936	452
Poly. order	4	4
Number of bins	4	1
Bin length	3.575	5.014



```
. rdbinselect March2012Returns zMarch2012, scale(5)
```

Number of bins for RD estimates - Method: Evenly spaced

Cutoff c = 0	Left of c	Right of c
Number of obs	1936	452
Poly. order	4	4
Number of bins	4	1
Bin length	3.575	5.014
Scale	5	5
Number of bins	20	5
Bin length	0.715	1.003

```
. rdbinselect March2012Returns zMarch2012, scale(10)
```

Number of bins for RD estimates - Method: Evenly spaced

Cutoff c = 0	Left of c	Right of c
Number of obs	1936	452
Poly. order	4	4
Number of bins	4	1
Bin length	3.575	5.014
Scale	10	10
Number of bins	40	10
Bin length	0.358	0.501

```
. rdbinselect March2012Returns zMarch2012, scale(20)
```

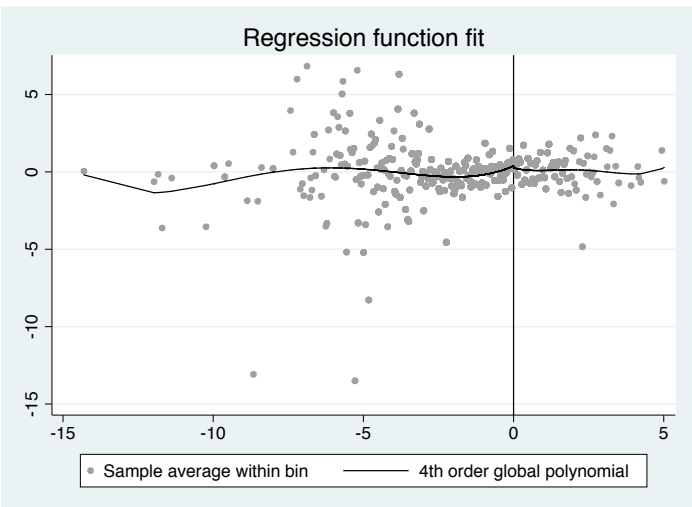
Number of bins for RD estimates - Method: Evenly spaced

Cutoff $c = 0$	Left of c	Right of c
-----+		
Number of obs	1936	452
Poly. order	4	4
Number of bins	4	1
Bin length	3.575	5.014
-----+		
Scale	20	20
Number of bins	80	20
Bin length	0.179	0.251

```
. rdbinselect March2012Returns zMarch2012, scale(100)
```

Number of bins for RD estimates - Method: Evenly spaced

Cutoff $c = 0$	Left of c	Right of c
-----+		
Number of obs	1936	452
Poly. order	4	4
Number of bins	4	1
Bin length	3.575	5.014
-----+		
Scale	100	100
Number of bins	400	100
Bin length	0.036	0.050



```
.  
.  
rd March2012Returns zMarch2012, x(Feb2012Returns Jan2012Returns Dec2011Returns  
Feb2012Returns)
```

Two variables specified; treatment is
assumed to jump from zero to one at $Z=0$.

Assignment variable Z is `zMarch2012`

Treatment variable X_T unspecified
Outcome variable y is March2012Returns

(11441 missing values generated)
(11441 missing values generated)
(11441 missing values generated)
Estimating for bandwidth 1.920688951509609
Estimating for bandwidth .9603444757548045
Estimating for bandwidth 3.841377903019218

March2012Returns	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
-----+-----						
Feb2012Returns	.069029	.299269	0.23	0.818	-.5175275	.6555854
Jan2012Returns	-.0311935	.4106279	-0.08	0.939	-.8360094	.7736225
Dec2011Returns	-.2400392	.3796684	-0.63	0.527	-.9841757	.5040973
Feb2012Returns	.069029	.299269	0.23	0.818	-.5175275	.6555854
lwald	.0973664	.3174192	0.31	0.759	-.5247639	.7194966
Feb2012Returns50	.2758638	.4186964	0.66	0.510	-.5447661	1.096494
Jan2012Returns50	.111816	.5627701	0.20	0.843	-.9911932	1.214825
Dec2011Returns50	-.0030955	.5813378	-0.01	0.996	-1.142497	1.136306
Feb2012Returns50	.2758638	.4186964	0.66	0.510	-.5447661	1.096494
lwald50	.2437	.4282994	0.57	0.569	-.5957515	1.083151
Feb2012Returns200	-.1164332	.2329036	-0.50	0.617	-.5729158	.3400494
Jan2012Returns200	-.3270491	.3319168	-0.99	0.324	-.977594	.3234957
Dec2011Returns200	-.0528505	.2708655	-0.20	0.845	-.5837372	.4780361
Feb2012Returns200	-.1164332	.2329036	-0.50	0.617	-.5729158	.3400494
lwald200	.0500512	.2479353	0.20	0.840	-.4358931	.5359956

. rd March2012Returns zMarch2012, x(Feb2012Returns Jan2012Returns April2012Returns
May2012Returns)
Two variables specified; treatment is
assumed to jump from zero to one at Z=0.

Assignment variable Z is zMarch2012
Treatment variable X_T unspecified
Outcome variable y is March2012Returns

(11441 missing values generated)
(11441 missing values generated)
(11441 missing values generated)
Estimating for bandwidth 1.920688951509609
Estimating for bandwidth .9603444757548045
Estimating for bandwidth 3.841377903019218

March2012Returns	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
-----+-----						
Feb2012Returns	.069029	.299269	0.23	0.818	-.5175275	.6555854
Jan2012Returns	-.0311935	.4106279	-0.08	0.939	-.8360094	.7736225
April2012Returns	.2171153	.2767262	0.78	0.433	-.3252582	.7594887
May2012Returns	-.7902727	.596989	-1.32	0.186	-1.96035	.3798042
lwald	.0973664	.3174192	0.31	0.759	-.5247639	.7194966
Feb2012Returns50	.2758638	.4186964	0.66	0.510	-.5447661	1.096494
Jan2012Returns50	.111816	.5627701	0.20	0.843	-.9911932	1.214825
April2012Returns50	.3339143	.3905415	0.86	0.393	-.431533	1.099362
May2012Returns50	-1.386988	.8680894	-1.60	0.110	-3.088412	.3144363

lwald50	.2437	.4282994	0.57	0.569	-.5957515	1.083151
Feb2012Returns200	-.1164332	.2329036	-0.50	0.617	-.5729158	.3400494
Jan2012Returns200	-.3270491	.3319168	-0.99	0.324	-.977594	.3234957
April2012Returns200	.2281118	.221696	1.03	0.304	-.2064043	.662628
May2012Returns200	-.2071432	.460209	-0.45	0.653	-1.109136	.6948498
lwald200	.0500512	.2479353	0.20	0.840	-.4358931	.5359956
