# When Paid Work Gives in to Unpaid Care Work: Evidence from the Hedge Fund Industry under COVID-19

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This version: October 18, 2021

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**Keywords**: Hedge funds, COVID-19, Gender bias, Unpaid care work
**JEL Classification**: G11, G14, G23.

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# When Paid Work Gives in to Unpaid Care Work: Evidence from the Hedge Fund Industry under COVID-19


## Abstract

We examine how childcare inequalities in the home affect the work productivity of female talent, using unique data on the family structures of hedge fund managers, and the exogenous shock from school closures during the early Covid-19 pandemic response. We find that female managers' ability to generate abnormal returns is curbed by 9% on average in the shock-month of school closures, providing a direct measure of the cost of unpaid care work. This effect is driven by mothers and especially mothers with young children. With increasing calls for more women representation in all layers of the economy and the efforts exerted towards that goal, there is reason for concern that these efforts might not factor in, as the pandemic has uncovered how women in general and mothers in particular bear both the burden of unpaid care work, and the subsequent cost to their paid work.



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*The year 2020, marking the twenty-fifth anniversary of the Beijing Platform for Action, was intended to be ground-breaking for gender equality. Instead, with the spread of the COVID-19 pandemic even the limited gains made in the past decades are at risk of being rolled back.*

United Nations Policy Brief 2020

# 1. Introduction

A thorn in the side of modern society is the persisting disparity across genders: Women do not participate to the economy to the same extent that men do. A well-established strand of literature points to the motherhood penalty (Correll et al. 2007, Giuliano 2020) and the persisting differential roles men and women play in the household as key elements of this lasting gap (Brenøe 2018, Bordalo et al. 2016, Bertrand et al. 2005, Bertrand 2020, Bennedsen et al. 2020, Zandberg 2021, Core 2020).

Attempting to redress this global imbalance has always been a key priority of almost every government and major political organization in the world. For instance, UNESCO reports gender equality to be one of its top two global priorities.[1] The European Commission also lists "promoting gender equality" as a core activity of the European Union.[2] While significant progress has been made since the 1995 Beijing Declaration and Platform for Action, the current pandemic and resulting government policies have inadvertently exposed persistent gender disparities at home, calling out for immediate action.

Using the exogenous shock of the COVID-19 response, we show that childcare falls on the shoulders of women, as the imposed lockdowns and nationwide school closures severely strained childcare options for working parents. Our empirical analyses exploit unique data on the family

[1] UNESCO Priority Gender Equality Action Plan (2014-2021).

[2] The European Commission's Strategic Engagement for Gender Equality (2016-2019) states: "Promoting gender equality is a core activity for the EU: equality between women and men is a fundamental EU value, an EU objective and a driver for economic growth. The Union shall aim to promote equality between men and women in all its activities".

structures of individual hedge fund managers, which offer a near-ideal setting to examine this question. First, hedge funds are highly human capital-intensive (Zingales 2000, Bloom et al. 2017) and directly exhibit managerial abilities (Brunnermeier & Nagel 2004, Kosowski et al. 2007, Agarwal et al. 2013). Hedge fund performance can be attributed to specific teams of managers, unlike other types of firms where complex organizational structures hinder directly linking firm performance to specific groups of individuals. Second, hedge funds report monthly returns, allowing researchers to analyze performance outcomes in a timely fashion, unlike other highly human-capital intensive industries, such as law firms and private equity firms, where performance is measured over longer time horizons. Third, hedge funds are a well-suited laboratory to study investment performance in times of crises and under limited managerial attention. Evidence has shown that when individual managers go through turbulent periods of personal life, such as marriages and divorces, their performances decrease around these events (Lu et al. 2016). At the same time, it has been documented that the market-timing ability in hedge funds at both the aggregate and fund levels is especially pronounced when the market is in decline and when it is more volatile (Chen & Liang 2007). Thus, crushing markets and high return volatility during the COVID-19 pandemic present a unique window to measure the cost of unpaid care work while opportunities for managers to earn excess returns are high.[3]

In this quasi-natural social experiment, neither formal nor informal help can be arranged. Child-care duties have to be shared by the parents, who, at the same time, are forced to work from home. We document that, similar to the general population where women still bear up to three times more unpaid care work than men (Ferrant et al. 2014, UN 2020), the lion's share of these duties is pronouncedly carried by women, even in the highly skilled and highly earning professions.

To gauge to which extent women shoulder the cost of unpaid care work, we start by looking at whether there are substantial differences in performance between male and female managers conditional on government restrictions regarding schooling. Our intuition is that this captures the immediate gendered effects of childcare on work productivity, whereby female managers' ability

[3]See for example, Neate and Jolly, "Hedge funds 'raking in billions' during coronavirus crisis", The Guardian, 9 April 2020.

to generate excess return is curbed due to increased parenting duties during the lockdowns. We measure women representation in funds by either a dummy variable that takes the value of one if the hedge fund counts at least one female manager, a dummy variable that takes the value of one if the proportion of women in the management team is higher than 50%, and the actual fraction of female managers in the team. We measure performance as the monthly ex-post excess return relative to the Fung & Hsieh (2001) model. To the extent that both male and female managers are highly skilled workers and are optimally chosen by hedge fund investors, we should not observe any impact of gender on hedge fund performance, as predicted by the human capital theory (Mincer 1958, Schultz 1959, 1960, 1961, Daniere 1965). Aggarwal & Boyson (2016) empirically test this prediction and report no difference in skill between male and female hedge fund managers in their sample of hedge funds from 1994 to 2013. This also holds under turbulent market conditions, such as the 2007-2008 financial crisis. We do not find any evidence that female managers underperform during September 2008, when Lehman Brothers defaulted, nor during the subsequent month. However, as we document, funds with female managers lost 9% abnormal returns on average during the shock-month of the first school closures in 2020.

A unique feature of our study is that we hand-collect information on the family composition of hedge fund managers, including the number of children and their ages. This allows us to identify managers with and without childcare responsibilities. This information is either found in managerial biographies on corporate websites, on their publicly available social media accounts or news coverage and magazine interviews. Based on the publication date of the information on children and their ages in any of the publicly available sources, we construct time-varying variables as to whether a given manager has children as well as their ages in the month where the fund performance is measured. We consistently find that parent managers generate significantly lower abnormal return during imposed school closures, and that this effect is driven by mothers, especially mothers of young children. Childless managers and fathers do not suffer this decline, nor is this effect driven by school closures in general. Our tests show that abnormal returns are not affected by neither gender nor parental status during normal school holidays, where alternative childcare provisions can be planned ahead.

Our tests provide strong evidence that women bear both the burden of unpaid care work, and the resulting cost to their paid work. There have been recurrent calls for more women representation in the economy in general and in the financial industry specifically. Not only is gender equality an important pillar of a modern society, but it is also an effective instrument to access unique value-driving resources, such as increased overall problem-solving capacity (Stiles 2001). Using survey data, more recent research has pointed out the detrimental effect of the pandemic-related government responses on labor market participation (Coibion et al. 2020). Following studies document the negative impact the pandemic response has had on the work productivity of women, both in the general population (Alon et al. 2020, 2021) and in academia (Barber et al. 2021). We contribute to this literature by offering a unique perspective on money managers. The combination of the hedge fund industry structure and our unique data on managers' parental status allows us to offer novel and quantifiable evidence on the differential impact of the COVID-19 pandemic on women. Our results suggest that despite the important progress in achieving gender equality, disparities persist even in the highly skilled jobs. This is reason for concern as working - and prospective - mothers may continue to be less favored by employers who would, in equilibrium, adjust to the maternity risk of working women by either optimally allocating women to "less exposed" jobs, or mitigate this risk by disfavoring equally-skilled women (Aldrich & Pfeffer 1976, Pfeffer & Salancik 1978). This will continue to pose a challenge to gender equality policy making.

## 2. Data

Hedge fund data is obtained from EurekaHedge and Lipper TASS, two of the most widely used databases in the hedge fund literature, with global coverage (Joenväärä et al. 2019). We source managerial information from Orbis - Bureau van Dijk and merge it with our hedge fund data. To make sure that fund performance fully reflects that of the managerial team, we first identify all individuals working at a given hedge fund by matching the fund's name and legal information to Orbis' universe of covered firms. We augment this list with single hedge fund companies using their names and legal information. We manually check that none of the management companies

is a bank or an investment trust, and exclude funds of hedge funds.

As Orbis provides information on all people associated with a company, we keep only managers with roles that have a material impact on fund performance, such as portfolio managers or CEOs. We exclude secretarial and assistant roles, as well as all roles related to human resources, public relations, accounting, and IT support. Orbis reports the start and end dates of employment for each employee. We use these dates to reconstruct a panel of observations, such that each manager is assigned to a fund only during the months of their actual employment. This allows us to precisely attribute fund performance to a particular managerial team as opposed to relying only on the managerial profiles from the hedge fund databases. The latter contain only a snapshot of managerial teams as of the last day of the database update, or may not contain individual manager information altogether.

The key managerial characteristic for our study is gender, which is reported by Orbis. We hand-collect this information where missing by cross-checking managerial profiles in the hedge fund databases. We verify salutations (Mr/Ms) and the use of pronouns (his/her). Still, if the gender cannot be identified, we check company websites and managerial LinkedIn profiles. We further go through the profile of each female manager manually to make sure that potential family name changes do not result in double counting. We account for cases where female managers change their names due to events such as marriage and are reported more than once because of such events.

As the lockdown policies are country-specific and will only affect managers effectively residing in those countries, we identify the country of residence of each manager in the sample. To this end, we first use the explicitly reported managerial address from Orbis. Where this is missing, we use fund countries as reported by EurekaHedge or TASS if they match the countries reported by Orbis.[4] We further require that for each fund and each date, all managers have the same country of residence, to ensure that the entire team is subject to the same country-wise school closures (if any) at the same time. We exclude 41 hedge funds from the analysis where managers live

[4]We find inconsistencies between the databases when a hedge fund is large with multiple offices. In this case, the managerial country of residence cannot be precisely identified and such funds are excluded from the analysis.

in different countries. We merge the information of managerial residence with the geographical data on COVID-19 from the World Health Organization and the COVID-19 datahub initiative (Guidotti & Ardia 2020)[5]. The data contain the numbers of confirmed cases and deaths, among others, as well as the precise dates of school closures within countries and territories, which we use to time the exogenous school-closure shock on managers' ability to work.

The descriptive statistics in Panel A of Table 1 show that all-male funds have similar raw returns compared to funds with female managers, on average. Mean and median returns are 0.67% and 0.50% per month for all-male funds and 0.62% and 0.49% for funds with female managers, respectively. All-male funds are more likely to use leverage, 76.69% of all-male funds report using leverage while 23.31% of funds with female managers do so. Funds with female managers are bigger in size and have larger teams. In 2020, funds with female managers control USD 429 million of assets with 5.55 team members on average, while all-male funds, on average, have 2.10 team members in charge of USD 229 million. It is noteworthy that around half of all-male funds have a single manager in charge of investment, while the share of single female-managed funds is negligible.

In terms of female managers representation (Panel B of Table 1), out of 3,409 individual managers, 14% are female. They are rather evenly distributed across different hedge fund styles and geographical regions. The female managers in our sample are representative of the total population of female hedge fund managers, as reported by AlphaMaven – one of the largest directories of hedge fund managers.[6] We provide the detailed comparison between our sample and AlphaMaven in the Internet Appendix, Table S1.

[Table 1 around here.]

[5] https://covid19datahub.io/

[6] https://alpha-maven.com/

# 3. Methodology and Empirical Results

## 3.1. Main regression specification

Using an estimation period (EP) of 24 months prior to 2020, for each hedge fund $i$ we estimate loadings $\beta_{ik}$ on the factors $F_k$ of the Fung & Hsieh (2001) model.[7] We then compute for each fund the abnormal returns $AR_{it}$ during the available months of year 2020 (the test period, TP). The abnormal returns are regressed on a shock to the schooling variable $School\_Closed_{it}$ and its interaction with the variables capturing female representation in the fund $FemaleVar$. We also control for fund size and the severity of pandemic in different countries, measured as the natural logarithm of the fund's assets under management ($lnAUM$), and the natural logarithm of the number of confirmed COVID-19 cases in the country of managerial residence ($lnConfirmed$), respectively.

In all our tests, we include both fund and month fixed effects ($u_i$ and $\tau_t$ respectively) and we double cluster standard errors by country and time. This framework has the benefit of controlling for fund-specific time-invariant variables that may affect the estimated coefficients of our variables of interest. Moreover, month fixed effects remove any unobservable characteristic that may affect all funds in any given time period, hence, this specification has the potential to significantly reduce concerns of the omitted variable bias.[8]

$$
\begin{aligned}
(1) \qquad R_{it} &= \alpha_i + \sum_{k=1}^{n^F} \beta_{ik} F_{t,k} + \varepsilon_{it}, \text{ if } t \in EP \\
AR_{it} &= R_{it} - \sum_{k=1}^{n^F} \hat{\beta}_{ik} F_{t,k} \text{ if } t \in TP
\end{aligned}
$$

[7] We use all the original 7 factors as well as the new emerging market factor and stock and interest rate trend following factors https://faculty.fuqua.duke.edu/~dah7/HFRFData.htm.

[8] We also run all our tests using country and style fixed effects instead of fund and time fixed effects. With this specification, we are able to include a broader set of fund-specific controls (such as the fee structure and redemption terms, among others) as well as other fund-level female representation variables. Importantly, all results (especially the estimated coefficients of the interaction terms between the female representation variables and the school closure dummies) remain qualitatively unchanged. We report these results in Table S2 in the Internet Appendix.

$$
\begin{aligned}
(2) \qquad AR_{it} &= a_0 + \delta School\_Closed_{it} + \kappa FemaleVar_{it} \times School\_Closed_{it} \\
&+ lnAUM_{it} + lnConfirmed_{it} + u_i + \tau_t + \eta_{it}
\end{aligned}
$$

The variable $School\_Closed_{it}$ takes the value of 1 if month $t$ is the first month in which schools were closed for more than a week due to lockdown in the managers' country of residence, and zero otherwise. If the unexpected school closure disproportionately affects female managers, we should observe a negative and significant coefficient $\kappa$ on the interaction term $FemaleVar \times School\_Closed$.

A unique feature of the first mandatory school closures compared to the follow-on ones is that they were accompanied by lockdowns, were highly unexpected and uniform country-wise, which provides a clean test of our hypotheses. Indeed, school reopening and end-of-lockdowns in the subsequent months show large differences in timing, scope and scale, across and even within the same countries. Such follow-on heterogeneity in school and government responses compromises the connection between the nominal school closure status and the required amount of care-time, compared to the first shock months. Table 2 reports the dates of school closures in the countries where managers are based in our sample, as well as the months which we consider as shock months. Figure 1 shows the time-line of school reopening for in-person instruction over the following year, highlighting substantial heterogeneity of the subsequent government actions across countries.

Another important feature of this period is the high market volatility, as we will discuss in detail in Section 3.5. Such market conditions provide perfect opportunities for skillful managers to earn high returns for their investors by implementing dynamic investment strategies (Chen & Liang 2007). If their attention is limited due to other duties, managers are more likely to move into less dynamic strategies which are closer to index investing, as suggested by Lu et al. (2016). Such a strategy drift is likely to lead to substantial losses.

We consider several measures of female representation within funds ($FemaleVar$). We use a dummy variable that takes the value of 1 for funds with at least one female managers ($IsFemale$), a dummy variable that equals one for funds with more than 50% of female managers ($IsFemale50$),

and the actual fraction of female managers in the fund (*Fraction_Females*). Table 3 lists all the variables used in the main regressions in alphabetical order with their definitions.

Our main regression results in Table 4 show that funds with female managers are severely affected by the school closure shock.[9] Abnormal returns of funds with at least one female manager decrease by about 9%, as captured by the negative and significant coefficient $\kappa$ (on $IsFemale \times School\_Closed$). It is important to stress that the 9% decline in abnormal returns measures the relative performance of funds with respected to their own expected performance given the previous return history. Hence, this can be seen as the monetary measure of the opportunity costs of not being able to devote 100% attention to the work during school closures. The opportunity costs can be large and negative, even if the total unadjusted performace is positive.

The estimated coefficient on the fraction of female managers ranges from -17.05 to -17.76. To put these numbers in perspective of the opportunity cost for a representative fund, in our sample only 16.7% of funds have female managers. Conditional on having a female manager, a median fund employs 3 managers in total one of whom is a woman, while an average fund has 5.55 managers in a team and 1.8 female managers. The typical fraction of female managers in a fund is, hence, around one third, if the funds employ at least one female manager. Taking an all-male fund with three managers as a benchmark, a similar fund with two male and one female managers is expected to have a negative 5.7% abnormal return ($-17.05 \cdot \frac{1}{3}$) on average, during the month of school closures.

[Table 4 around here.]

## 3.2. Regular school holidays

To verify that the performance of female managers is not strained by school closures in general, we repeat our analysis during regular school holidays. The key difference between regular school holidays and school closures during the COVID-19 lockdowns is that the dates of regular school holidays are known well in advance, and alternative formal and informal childcare provisions can

[9] Note, the number of observations in the regressions including control variables is slightly lower than in the specifications without controls, due to some funds not reporting their assets under management.

be planned ahead.

Similar to our main regression, we use a 24-month EP during years 2016-2017, and year 2018 as the TP. We replace the variable *School_Closed* in Equation (2) with the dummy variable *Holidays* for regular school closures, which takes the value of 1 during the months of scheduled school holidays. We use 2018 as a test year to ensure that the sample of managers is closest to our main regression sample, while keeping a gap year (2019) to counterpoise any effect from the COVID-19 period. If regular school holidays do not affect the productivity of female managers given the possibility of advanced childcare planning, the estimated $\kappa$ in Equation (2) should not be significant. A significantly negative $\kappa$ would indicate that female managers divert their attention from paid work to childcare also during regular school holidays.

The results reported in Table 5 do not indicate any significant difference in abnormal returns between all-male funds and funds with different levels of female representation. This suggests that our results on the COVID-19 period are not driven by school closures per se. Rather, they are likely driven by the sudden increase in childcare duties, that could not be delegated or outsourced in any way due to the binding lockdown measures.

[Table 5 around here.]

## 3.3. A counterfactual experiment: Lehman Brothers bankruptcy

An alternative explanation of the underperformance of funds with female managers during the shock-months of school closures could be that female managers generally respond differently to unexpected shocks to the system compared to their male peers. Therefore, we use the financial crisis period 2007-2008 as an additional test period to verify the plausibility of this alternative explanation. We estimate the model in the pre-crisis sample from 2005 to 2006 and re-run our tests with Lehman Brothers bankruptcy in September 2008 as a shock, thus focusing on the relative abnormal performance of funds with and without female managers in September 2008. As reported in Table 6, we find no evidence that funds with female managers underperform during the month of Lehman Brothers' bankruptcy. In fact, they exhibited higher skills during this turbulent period.

This finding is consistent with the prior literature. For example, Adams & Ragunathan (2017) find that banks with more women perform better than other banks, while Van Staveren (2014) concludes that female portfolio managers tend to outperform men under uncertainty. As we will discuss in more detail in Section 3.5, the market conditions were as severe if not worse in Fall of 2008 as in March 2020. Yet, there is no sign of decline in abnormal performance of funds with female managers in September 2008.

[Table 6 around here.]

## 3.4. Family structure implications

To measure to which extent the decline in performance of female managers is driven by increasing childcare duties during the shock-month of school closures, we collect unique data on the family structures of fund managers. We start by looking up the professional managerial profiles on corporate websites and on LinkedIn. In about 10% of the cases, the information on families are directly available there. Examples include instances where the corporate biographies have statements like "Mr. Doe lives in California with his wife and their three children", or LinkedIn pages of managers who identify as, for example,"proud mother of two" in their profile statements. When the information is not available or insufficient, we use a matching algorithm in Python that is based on an extensive textual websearch, which *tags* pages that have mentions of the managers based on different combinations of their names, company affiliations, alma mater, and keywords such as "father", "mother", "son", "daughter", etc. If managerial professional pictures are publicly available (for example, in corporate websites), we also perform reverse image lookups based on the links to these pictures, in order to match them to any publicly available social media accounts that would confirm the manager's parental status. These procedures only tag relevant webpages, which we further manually screen to structure the information needed.

This search yields results for 507 managers, including 150 female managers, for whom we explicitly know whether they have children, and if any, their ages. Both female and male managers have around two children on average, with the average children's age being 11.78 years old for

female managers and 10.74 years old for male managers as of 2020 (Table 7). Most parents in the sample have at least one child below 12 years of age, as shown by the reported percentages. Our TP effectively comprises 291 of the identified managers, 25% of whom are women. The size of our sample is not unusual for papers studying personal managerial characteristics. To illustrate, Yermack (2014) studies the effect of CEO vacation time on firm performance, using a sample of 66 CEOs from 65 companies. Lu et al. (2016) analyse the effect of marital events on the performance of hedge fund managers, using an effective sample of 98 marriages and 76 divorces.

Using these unique data on the family structures of fund managers, we create fund-level variables capturing the levels of childcare responsibilities within those funds. In particular, we define $Fraction\_Parents$ as the fraction of managers in the fund whom we know have children. Since we collect the ages of children as of 2020, we reconstruct the managerial parental status in previous years. For example, a manager with a one-year old baby in 2020 is classified as a parent in 2020, and appears as a manager without children in 2018. We combine the information on parenthood and gender and compute the fraction of mothers ($Fraction\_Mothers$) and that of fathers ($Fraction\_Fathers$) among all the managers in the fund. We repeat the analysis in Equation (2), first, substituting $FemaleVar$ with the variable $Fraction\_Parents$, and second, using $Fraction\_Mothers$ and $Fraction\_Fathers$ in the same regression instead of the single variable $Fraction\_Parents$. If mothers and fathers equally contribute to childcare, we should observe similar coefficients on the fractions of parents, mothers and fathers.

To further disentangle the effect of gender and parenthood, we also include in the regressions two variables capturing managers who are confirmed not to have children: $Fraction\_Not\_Mothers$ and $Fraction\_Not\_Fathers$. If increasing childcare duties are the key factor hindering the performance of female managers during the school closure shock, we should observe a significantly negative effect on abnormal returns for $Fraction\_Mothers$, but not for $Fraction\_Not\_Mothers$. If the observed effect, on the contrary, is driven solely by other gender-specific characteristics, we should observe the same effect on all women, regardless of their parental status.

The results reported in Table 8 show that while the the loss in abnormal returns pertains to

parents, it is disproportionately carried by mothers during school closures. Having one parent in a team of three managers leads to around 2% loss in abnormal return during the month of school closures ($-6.37 \cdot \frac{1}{3}$, on average), while having a mother in a team of three managers is associated with around 8% ($-25.06 \cdot \frac{1}{3}$) loss in abnormal returns. Considering that even among funds that employ women the median fraction of mothers is 13%, the estimated coefficient of $-25.06$ translates into a reduction of abnormal returns during the school closures by 3.26% ($-25.06 \cdot 0.13$) for a representative fund. This effect is not statistically significant for fathers, the same is true for $Fraction\_Not\_Mothers$, which does not show any significant effect on fund performance during the school closure shock. This provides strong evidence that the loss in abnormal returns is experienced by women with childcare responsibilities, and it is not related to any other gender-specific characteristics. At the same time, similar to our earlier findings, regular school holidays do not hinder the productivity of parents, fathers and mothers alike, as well as managers without children (Table 9). Being a parent does not preclude managers from performing well at work, as long as they are able to plan ahead.

[Tables 8 and 9 around here.]

The time and effort cost associated with childcare is substantially higher for younger children. Therefore, we also construct parenthood variables with managers whose children are on average below 12 years of age, and managers whose youngest child is below 12. This is the earliest age of parental independence across multiple cultural backgrounds (Bulcroft et al. 1996, among others). We denote these variables by a suffix "_mean12" and "_min12" and repeat our analysis. The results reported in Tables 10 and 11 are consistent with this intuition, and the effect is amplified for mothers. A hedge fund with one mother of young children in a team of three managers experiences a relative loss of around 12-13% ($-36.99 \cdot \frac{1}{3}$ to $-39.30 \cdot \frac{1}{3}$) during the shock-month of school closures, while it is not statistically significant for fathers. Our results remain consistent with the baseline findings of no effect during regular school holidays, where alternative childcare provisions are available.

Overall, our results provide strong evidence that unpaid childcare falls squarely on women's

shoulders, effectively hindering their ability to perform on their jobs when alternative provisions cannot be arranged. The unexpected school closure shock during COVID-19 lockdowns has clearly exposed this lingering disparity.

### 3.5. Discussion of the results

In order to put the magnitude of the observed effect in the context of volatile markets where inattention could have been especially costly, we characterize the performance of different asset classes during early months of 2020 and discuss the possible mechanisms contributing to the performance decline.

We look at the US, European, and emerging economies' equity and bond markets, as well as real estate and global commodities markets. To measure the performance of these markets, we use the corresponding total return indices. These include the S&P 500, EuroStoxx, and MSCI Emerging market indices, which are obtained from Eikon Datastream. The Merrill Lynch BBB US Corporate Bond Total Return Index is obtained from Federal Reserve Economic Data[10](FRED). The S&P Eurozone Investment Grade Corporate Bond Index and the Bloomberg Aggregate Corporate Bond Index, the Dow Jones U.S. Real Estate Index, as well as the S&P Global Macro Commodities Index are sourced from Capital IQ and Bloomberg. In addition, we characterize the dynamics of the CBOE Volatility Index (VIX) obtained from FRED.[11]

Panel A of Table 12 reports the realized monthly log returns and the daily return volatilities for all indices in the months from January to May 2020. As a benchmark, the average values of the monthly log returns and the intra-month daily return volatilities during the previous two years (2018-2019) are also reported. For each month in 2020 we report the percentage increase in the daily return volatility relative to the benchmark years. The last column reports the average values of the VIX index within each month, its intra-month volatility, and the percentage change in volatility relative to the 2018-2019 period. In January 2020 the equity markets started to decline,

[10] https://fred.stlouisfed.org/series/BAMLCC0A4BBBTRIV

[11] https://fred.stlouisfed.org/series/VIXCLS

with the EuroStoxx index losing 2.29% and the MSCI Emerging Markets Index losing 4.81%, while the daily return volatility remained close to the previous two-year average level, which is also captured by the near-average level of the VIX index. Markets continue to decline in February 2020, with the S&P500 losing 8.59%, while the volatility substantially increases. March 2020 exhibits extremely poor market performance: the US equity was down by 13.18%, the Eurozone Investment Grade Bond index declined by 6.56%, while the Commodities index lost 33.84% in one month. Such uniform market collapses are accompanied by extremely high intra-month volatility of the daily returns. For the S&P500, for example, the daily return volatility in March 2020 was 5.93%, which is more than seven times the average pre-COVID level in 2018-2019. Later in the year (April and May) the markets have relatively recovered and the volatility decreased, although it remained at higher levels than observed in 2018-2019.

Such dramatic market conditions as in March 2020 are not, however, unprecedented. Panel B of Table 12 reports similar statistics for the 2008 financial crisis period. Years 2005-2006 represent the pre-crisis benchmark performance period, while the statistics from August to December 2008 highlight the months around the Lehman Brothers bankruptcy shock – at the height of the crisis. The realized negative market returns in September and October 2008 were at times even larger in magnitude than those in March 2020. The volatility increase across all markets is comparable with that in March 2020, and the high-volatility regime persisted for longer. For example, in December 2008, when the S&P500 realized return turned positive after a quarter of extremely poor performance, the intra-month daily return volatility was still five times higher than during the pre-crisis years.

Despite such similarities in the overall market conditions during the months of Lehman Brothers bankruptcy in 2008 and the early months of the COVID-19 pandemic in 2020, the significant decline in abnormal returns for funds with female managers only pertains to the Covid-19 period, as our results show. High volatility on declining markets provides perfect opportunities for dynamic, market timing strategies to perform especially well, while limited attention on important trades or passive investment would result in substantial losses. We show that the substantial increase in childcare demand during the school closure shock was particularly costly for female managers with

children, as it hindered their ability to effectively time the market during this period of high gain opportunities and large losses risks.[12]

[Table 12 around here.]

Recent literature also sheds some light on the lost productive time by women during the pandemic in different fields. Barber et al. (2021) document a 34.3% decrease in time allocated to research among female academics. Assuming a nine-hour working day, this easily amounts to more than a 15-hour loss in productivity a week. Andrew et al. (2021) conduct an extensive survey of the UK population and report that during the lockdown, mothers shouldered four more hours a day than fathers in increased childcare and housework. Hence, school closures have put a massive time constraint on women's productive working hours, which ultimately led to the performance loss we document. To further stress test this hypothesis, we conjecture that hedge fund styles for which monitoring is more time consuming, and inattention is costly due to higher transactions costs and difficulties to unwind positions, should experience larger abnormal losses during school closures if their managers are not able to allocate more time into monitoring. Similarly, "easy to monitor" styles should suffer less extreme negative abnormal returns.[13] To tests this conjecture, we create two indicators *Easy_Monitoring* and *Attention_Hungry*. *Easy_Monitoring* takes the value of one for hedge fund styles that conventionally invest in the asset classes with less time-consuming monitoring processes. These include Long Short Equity, CTA/Managed Futures, Equity Market Neutral and Multi-Strategy. *Attention_Hungry* takes the value of one for other styles, including Arbitrage, Convertible Arbitrage, Distressed Debt, Emerging Markets, Event Driven, Fixed Income, Fixed Income Arbitrage, Macro, Relative Value, as well as funds that repot other, less commonly used styles. This definition is related to the division of funds into capacity constrained and unconstrained in Liang et al. (2019). We then include into the regressions additional triple interactions between parental status variables, the school closure dummy and the indicators for

[12]We provide in Table S14 in the Internet Appendix simulations of expected and abnormal returns from implementing (or not) dynamic allocation strategies on declining markets. Even though the simulations are implemented under simplified representations of the dynamic strategies, they illustrate that a very large spectrum of positive and negative abnormal returns can be achieved on such volatile markets.

[13]We thank the Associate Editor for this valuable suggestion.

easy-to-monitor or attention-hungry styles.

The results reported in Table 13 support this conjecture. The abnormal returns during the school closure shock are ameliorated for managers with children in easy-to-monitor styles, while remaining negative and larger in magnitude for funds with attention-hungry styles. The reported main average effect of the fraction of parents of around -6 in Table 8 increases to about -13 for attention-hungry styles in Table 13, while the effect of parenthood in easy-to-monitor styles is not statistically significant. Further controlling separately for fractions of mothers and fathers in the funds, we see that the effect is disproportionally driven by mothers. For attention-hungry styles, the estimated coefficient on *Fraction_Mothers* is around -26, while that for *Fraction_Fathers* is around -8. A fund with one mother out of three managers, hence, experiences about 8.7% ($-26 \cdot \frac{1}{3}$) drop in abnormal returns for attention-hungry styles, while a fund with one father out of three managers loses only 2.7% ($-8 \cdot \frac{1}{3}$) in abnormal returns. Additional childcare responsibilities during COVID-19 related school closures hinder the ability of all parents to work, yet the cost is disproportionally carried by mothers.

For easy-to-monitor styles, the effect is milder for mothers, but it still remains statistically significant and negative, with the estimated coefficients ranging from -16 to -23, indicating that even though some styles do require less monitoring time, the required level of attention is still higher than the available time female managers with childcare responsibilities had in hand during the COVID-19 related school closures. Easy-to-monitor funds managed by fathers do not exhibit any significant decline in abnormal returns during school closures. Similar to our main results, the effect is larger in magnitude for mothers with small children, while there is no significant change in abnormal returns for managers without children regardless of their gender and the fund style.

[Table 13 around here.]

# 4. Robustness Checks

We perform an extensive set of robustness checks with respect to the methodology and sample construction to stress-test the stability of our results. These tests strongly support our findings. We list and briefly discuss all the robustness checks herein, and report detailed supplementary results in the Internet Appendix.

1. We estimate the model with country and style fixed effects instead of fund fixed effects, to allow uising a wider set of fund-specific variables, including an indicator for different levels of female representation, and other fund-specific controls such as the fee structure and investor restrictions among others.

2. To verify that our results are not driven by country-specific representations of women in the hedge fund industry, we repeat the analysis using the subsample of countries which have both male and female managers.

3. To control for potentially poor in-sample performance of the Fung & Hsieh (2001) model, we restrict the analysis to funds for which the R-squared of the first-stage regression in Equation (1) is above 50%.

4. To check that the results are not driven by poorly performing funds, we repeat the analysis using only funds for which the estimated in-sample alpha in the first-stage regression is above the median.

5. To check that our results are not driven by a differential exposure of funds to various industries, we use 10 Fama-French industry portfolios as representative asset classes, and regress hedge fund returns in the EP on the performance of these industry portfolios. The resulting ARs are computed relative to the estimated exposure to the spectrum of equity industry portfolios.

6. We use an alternative specification of the benchmark model to compute hedge fund exposures and ARs. We use eight EurekaHedge hedge fund indices as representative asset classes, covering the major hedge fund strategies in our sample. These include: Arbitrage Hedge

Fund Index, CTA/Managed Futures Hedge Fund Index, Commodity Hedge Fund Index, Emerging Markets Hedge Fund Index, Fixed Income Hedge Fund Index, Long-Short Equities Hedge Fund Index, Macro Hedge Fund Index, and Relative Value Hedge Fund Index.

7. We test different lengths of the EP. First, we use a 36-month EP, requiring funds to have at least 3 years of returns before 2020. Next, we use a 60-month EP requiring either a minimum of 24 or 36 return months before 2020. Hence, we require funds to be alive for 2 or 3 years before 2020, but use up to 5 years of return history if available to estimate factor loadings.

8. To further support the results on female managers' performance during turbulent market times, we estimate the model in the month following Lehman Brothers bankruptcy, measuring the effect in October 2008. The *Post-Lehman* month witnessed large negative market returns and extremely high daily return volatility, similar to what is observed in September 2008 and March 2020.

9. We use the change in abnormal returns $\Delta AR_{it}$ as an alternative dependent variable.

10. We use propensity score matching to account for the possible effect of confounding variables, which can impact the observed outcomes. We match each hedge fund with a female manager in a country which experienced school closures to the most similar fund without female managers. The matching is performed using the average AR of the funds over the previous quarter to the shock-month, and we require the difference in the propensity scores to be less than 0.01 to call a pair of funds a match. Thus, we choose funds with the closest if not identical performance just before the school closure shock. We next test for the difference in means in their ARs during the school closure month. Although the sample is smaller with only 39 matched pairs of funds, our results hold. Funds with female managers underperform by a negative and significant 7.35%, compared to -0.39% for all-male funds.

# 5. Conclusion

The exogenous nature of the recent COVID-19 pandemic and the hedge fund industry organization structure offer a near-ideal testing ground to assess the extent of the persisting disparity between genders in terms of unpaid care work. Lockdowns and unexpected school closures imposed by governments across the globe in response to COVID-19 have put a heavy strain on managers with caring responsibilities, hampering their ability to perform on the job. This, we show, has affected men and women differently as women carried most of the childcare. Our evidence shows that the increasing childcare responsibilities during the imposed nation-wide school closures fell mostly on the shoulders of female managers, diverting their time and attention from work. Across all measures of women representation within hedge funds, we consistently find a negative and significant effect of school closures on the performance of funds with female managers, unlike all-male funds, whose performance is unaffected. This effect disappears when we run similar tests conditional on regular school holidays and another severe market shock (Lehman Brothers bankruptcy in September 2008), where we find that female managers perform at least the same, if not outperform their male peers. Our tests using unique hand collected data on the family structure of managers support these findings, showing that the significant and severe underperformance during the lockdown is disproportionally carried by mothers. This effect is further amplified for mothers with young children and those working in attention-hungry hedge fund strategies. Our results are robust to alternative performance measures, longer estimation periods, and variations of model specifications.

Our findings are particularly concerning as attempting to redress gender imbalances has been a key priority of almost every government and political organization in the world. According to a 2014 report by OECD (Ferrant et al. 2014), women spent two to ten times more time on unpaid care than men. The International Labour Organization (2018) reports that women perform 76.2 per cent of total hours on unpaid care work, more than three times compared to men, as supported by the March 2020 Generation Equality Action Pack by the UN (UN Women 2020). Our study holds important policy implications as we provide tangible evidence that these differences persist, and that some of the measures enacted to control the pandemic may have possibly turned back

the clock on gender parity. We show that the highly qualified, highly skilled, and highly educated women are not spared, as they had to contribute significantly more than men to childcare during the lockdowns. Consequently, mothers bear the losses to their performance at work, which are significantly larger than those of fathers. Unless a radical social change takes place, gender equality is still a long way off.

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## Table 1: Descriptive statistics

This table reports the descriptive statistics of the returns and other characteristics of hedge funds in our sample (Panel A), and managerial distribution across hedge fund styles and regions (Panel B). The statistics are reported for the complete sample, as well as for the available months of 2020.

| | Total Sample | | COVID-19 Sample | |
|---|---|---|---|---|
| Panel A: HF characteristics | | | | |
| | All Male | With Females | All Male | With Females |
| Fund Returns | | | | |
| Mean | 0.67 | 0.62 | -1.73 | -1.57 |
| St. Dev. | 3.84 | 3.48 | 7.67 | 6.22 |
| Median | 0.50 | 0.49 | -1.34 | -1.12 |
| p25 | 0.16 | 0.11 | -3.90 | -2.84 |
| p75 | 0.90 | 0.85 | 0.40 | 0.07 |
| Other Characteristics | | | | |
| Fund×month obs. | 53,824 | 13,528 | 824 | 170 |
| Average Team Size | 2.06 | 8.15 | 2.10 | 5.55 |
| Mean AUM | 149 | 205 | 229 | 429 |
| Performance Fee (%) | 17.28 | 17.02 | 15.98 | 15.73 |
| Management Fee (%) | 1.47 | 1.42 | 1.40 | 1.33 |
| Lockup months | 3.16 | 2.76 | 3.12 | 3.55 |
| Notice period (days) | 36.34 | 33.55 | 34.75 | 35.07 |
| Leverage (% of HFs) | 76.69 | 23.31 | 83.33 | 16.67 |
| Panel B: Managerial distribution by style and geography | | | | |
| | Total Managers | Fraction Women | Total Managers | Fraction Women |
| Total | 3,409 | 0.14 | 930 | 0.11 |
| Style | | | | |
| Fixed Income | 283 | 0.19 | 77 | 0.25 |
| Long Short Equity | 1244 | 0.13 | 394 | 0.11 |
| Multi-Strategy | 265 | 0.12 | 94 | 0.14 |
| Relative Value | 92 | 0.22 | 31 | 0.19 |
| Other | 1,525 | 0.13 | 334 | 0.06 |
| Region | | | | |
| North America | 1,475 | 0.15 | 396 | 0.10 |
| Europe excl. UK | 457 | 0.11 | 130 | 0.07 |
| UK | 1218 | 0.14 | 249 | 0.16 |
| Asia Pacific | 163 | 0.07 | 97 | 0.07 |
| Rest of the World | 96 | 0.11 | 58 | 0.12 |

Table 2: Timing of school closures across the world

The table repots the starting dates of nation-wide school closures in the countries in our sample, the final date until which the school were nationally closed, as well as the resulting month used as a shock month in our sample.

| Manager's Residence Country | First pandemic-related school closure date | Last date of schools being nationally closed | Considered Shock Month |
|---|---|---|---|
| Argentina | 16-Mar-2020 | 8-Mar-2021 | March |
| Australia | 24-Mar-2020 | 15-Apr-2020 | March |
| Brazil | 12-Mar-2020 | 10-Nov-2020 | March |
| Canada | 16-Mar-2020 | 8-Sep-2020 | March |
| Denmark | 13-Mar-2020 | 15-Apr-2020 | March |
| France | 2-Mar-2020 | 11-May-2020 | March |
| Germany | 16-Mar-2020 | 4-May-2020 | March |
| Hong Kong | 26-Jan-2020 | 20-May-2020 | January |
| India | 13-Mar-2020 | 1-Oct-2020 | March |
| Ireland | 13-Mar-2020 | 26-Jun-2020 | March |
| Israel | 13-Mar-2020 | 3-May-2020 | March |
| Italy | 23-Feb-2020 | 21-Sep-2020 | February |
| Japan | 2-Mar-2020 | 1-Jun-2020 | March |
| Luxembourg | 16-Mar-2020 | 4-May-2020 | March |
| Malaysia | 14-Mar-2020 | 24-Jun-2020 | March |
| Netherlands | 16-Mar-2020 | 11-May-2020 | March |
| Norway | 12-Mar-2020 | 27-Apr-2020 | March |
| Qatar | 10-Mar-2020 | 1-Sep-2020 | March |
| Singapore | 8-Apr-2020 | 2-Jun-2020 | April |
| South Africa | 18-Mar-2020 | 8-Jun-2020 | March |
| Spain | 9-Mar-2020 | 26-May-2020 | March |
| Switzerland | 16-Mar-2020 | 11-May-2020 | March |
| UK | 18-Mar-2020 | 13-Aug-2020 | March |
| US | 5-Mar-2020 | 3-Feb-2021 | March |

Table 3: Variables definitions

This table lists all the variables used in the regressions in alphabetical order with their definitions.

| Variable | Description |
|---|---|
| AR | Abnormal Return - The monthly ex-post excess return relative to the Fung & Hsieh (2001) seven-factor model. |
| Attention_Hungry | Dummy that takes the value of one for hedge fund styles that conventionally invest in the asset classes with more time-consuming monitoring processes. These include Arbitrage, Convertible Arbitrage, Distressed Debt, Emerging Markets, Event Driven, Fixed Income, Fixed Income Arbitrage, Macro, Relative Value, and Other styles. |
| Easy_Monitoring | Dummy that takes the value of one for hedge fund styles that conventionally invest in the asset classes with less time-consuming monitoring processes. These include Long Short Equity, CTA/Managed Futures, Equity Market Neutral and Multi-Strategy styles. |
| Fraction_Fathers | Fraction of male fund managers with children relative to the total number of managers in a given month. |
| Fraction_Fathers_mean12 | Fraction of male fund managers with young children (average child age below 12 years-old) relative to the total number of managers in a given month. |
| Fraction_Fathers_min12 | Fraction of male fund managers with young children (minimum child age below 12 years-old) relative to the total number of managers in a given month. |
| Fraction_Females | The fraction of female managers as of the reporting month, calculated as the number of active female managers in a fund divided by the total number of active managers. |
| Fraction_Mothers | Fraction of female fund managers with children relative to the total number of managers in a given month. |
| Fraction_Mothers_mean12 | Fraction of female fund managers with young children (average child age below 12 years-old) relative to the total number of managers in a given month. |
| Fraction_Mothers_min12 | Fraction of female fund managers with young children (minimum child age below 12 years-old) relative to the total number of managers in a given month. |
| Fraction_Not_Fathers | Fraction of male fund managers with no children relative to the total number of managers in a given month. |
| Fraction_Not_Mothers | Fraction of female fund managers with no children relative to the total number of managers in a given month. |
| Fraction_Parents | Fraction of fund managers with children relative to the total number of managers in a given month. |
| Fraction_Parents_mean12 | Fraction of fund managers with young children (average child age below 12 years-old) relative to the total number of managers in a given month. |
| Fraction_Parents_min12 | Fraction of fund managers with young children (minimum child age below 12 years-old) relative to the total number of managers in a given month. |
| Holidays | Dummy that takes the value of one if, in the country of residence of managers, schools are closed for normal holidays, and zero otherwise. |
| IsFemale | Dummy that takes the value of one if at least one manager in the fund is female, and zero otherwise. |
| IsFemale50 | Dummy that takes the value of one if at least 50% of managers in the fund are female, and zero otherwise. |
| Lehman | Dummy that takes the value of one in September 2008 and zero otherwise. |
| lnAUM | Natural logarithm of the fund's assets under management, in million USD |
| lnConfirmed | Natural logarithm of the official number of confirmed Covid-19 cases in the country of residence of managers in a given month. |
| School_Closed | Dummy that takes the value of one during the first month when schools were closed for more than a week due to COVID-19 in the country of residence of managers, and zero otherwise. |

Table 4: Abnormal returns during school closure shock

This table reports the estimation results for the regression in Equation (2) of the ex-post hedge fund abnormal returns in 2020 for funds with different levels of female representation. All variable definitions are reported in Table 3. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| School_Closed | 2.35 | -0.29 | 2.12 | -0.26 | 2.37 | -0.02 |
| | (1.54) | (-0.15) | (1.39) | (-0.13) | (1.61) | (-0.01) |
| IsFemale · School_Closed | -9.87*** | -9.52** | | | | |
| | (-2.94) | (-2.52) | | | | |
| IsFemale50 · School_Closed | | | -14.73*** | -15.92*** | | |
| | | | (-3.11) | (-2.75) | | |
| Fraction_Females · School_Closed | | | | | -17.05*** | -17.76** |
| | | | | | (-2.72) | (-2.46) |
| lnAUM | | 4.87 | | 5.26 | | 5.06 |
| | | (0.95) | | (1.02) | | (0.98) |
| lnConfirmed | | 0.56 | | 0.50 | | 0.51 |
| | | (1.21) | | (1.07) | | (1.09) |
| Constant | 0.19 | -27.76 | 0.49 | -28.82 | 0.32 | -28.01 |
| | (0.06) | (-1.14) | (0.14) | (-1.18) | (0.10) | (-1.15) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.14 | 0.19 | 0.14 | 0.20 | 0.14 | 0.19 |
| Nobs | 994 | 880 | 994 | 880 | 994 | 880 |

## Table 5: Regular school holidays

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns during normal school holidays in 2018 for funds with different levels of female representation. *Holidays* is a dummy variable taking the value of 1 during the months of scheduled school holidays, and zero otherwise. All variable definitions are reported in Table 3. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Holidays | -0.46** | -0.48** | -0.40** | -0.42* | -0.43** | -0.45* |
| | (-2.20) | (-2.02) | (-2.01) | (-1.85) | (-2.11) | (-1.91) |
| IsFemale · Holidays | 0.41 | 0.41 | | | | |
| | (1.26) | (1.13) | | | | |
| IsFemale50 · Holidays | | | -0.03 | -0.13 | | |
| | | | (-0.07) | (-0.21) | | |
| Fraction_Females · Holidays | | | | | 0.44 | 0.38 |
| | | | | | (0.82) | (0.60) |
| lnAUM | | 0.55 | | 0.56 | | 0.56 |
| | | (0.59) | | (0.60) | | (0.59) |
| Constant | 1.20*** | -1.17 | 1.20*** | -1.22 | 1.20*** | -1.19 |
| | (3.40) | (-0.29) | (3.38) | (-0.30) | (3.39) | (-0.29) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.11 | 0.12 | 0.11 | 0.12 | 0.11 | 0.12 |
| Nobs | 3615 | 3201 | 3615 | 3201 | 3615 | 3201 |

## Table 6: The Lehman Brothers bankruptcy shock

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2007-2008 for funds with different levels of female representation. Lehman takes the value of 1 in September 2008. All variable definitions are reported in Table 3. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Lehman | -6.21*** | -5.44*** | -6.09*** | -5.11*** | -6.32*** | -5.32*** |
| | (-3.84) | (-3.09) | (-3.72) | (-2.90) | (-3.59) | (-2.82) |
| IsFemale · Lehman | 2.39** | 3.46*** | | | | |
| | (2.25) | (2.70) | | | | |
| IsFemale50 · Lehman | | | 5.21*** | 4.51*** | | |
| | | | (3.06) | (2.64) | | |
| Fraction_Females · Lehman | | | | | 7.87*** | 6.21** |
| | | | | | (2.99) | (2.47) |
| lnAUM | | 0.32 | | 0.34 | | 0.33 |
| | | (0.45) | | (0.48) | | (0.47) |
| Constant | 0.22 | -1.10 | 0.22 | -1.18 | 0.22 | -1.15 |
| | (0.71) | (-0.34) | (0.71) | (-0.36) | (0.71) | (-0.35) |
| Fund FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.12 | 0.11 | 0.12 | 0.11 | 0.12 | 0.11 |
| Nobs | 3069 | 2306 | 3069 | 2306 | 3069 | 2306 |

Table 7: Managers with confirmed parental status

This table reports the total number of male and female managers with confirmed parental status, their average ages, and their family structure information.

| | Male | Female |
|---|---|---|
| Number of managers | 357 | 150 |
| Of whom are confirmed non-parents | 147 | 63 |
| Of whom are confirmed parents | 210 | 87 |
| % Parents with young children (age below 12) | 58% | 57% |
| Average number of children | 1.98 | 2.03 |
| Average age of children | 10.74 | 11.78 |
| Average age of managers | 45.74 | 42.11 |

Table 8: Abnormal returns during school closure shock: Parental status effect

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2020 controlling for the parental status of fund managers. All variable definitions are reported in Table 3. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| School_Closed | 2.71* | -0.11 | 2.73* | 0.03 | 2.76* | -0.02 |
| | (1.76) | (-0.05) | (1.77) | (0.02) | (1.82) | (-0.01) |
| Fraction_Parents · School_Closed | -7.02*** | -6.37** | | | | |
| | (-3.17) | (-2.43) | | | | |
| Fraction_Fathers · School_Closed | | | -3.22 | -2.57 | -3.22 | -2.37 |
| | | | (-1.58) | (-0.98) | (-1.51) | (-0.86) |
| Fraction_Mothers · School_Closed | | | -26.10** | -25.06** | -26.01** | -24.56** |
| | | | (-2.59) | (-2.32) | (-2.56) | (-2.25) |
| Fraction_Not_Fathers · School_Closed | | | | | 0.07 | 1.06 |
| | | | | | (0.02) | (0.26) |
| Fraction_Not_Mothers · School_Closed | | | | | -3.96 | -13.37 |
| | | | | | (-0.47) | (-1.04) |
| lnAUM | | 5.07 | | 5.21 | | 5.37 |
| | | (0.97) | | (1.02) | | (1.05) |
| lnConfirmed | | 0.54 | | 0.53 | | 0.53 |
| | | (1.16) | | (1.13) | | (1.13) |
| Constant | 0.53 | -28.45 | 0.65 | -28.89 | 0.67 | -29.56 |
| | (0.16) | (-1.15) | (0.19) | (-1.19) | (0.20) | (-1.22) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.13 | 0.18 | 0.14 | 0.19 | 0.14 | 0.20 |
| Nobs | 994 | 880 | 994 | 880 | 994 | 880 |

Table 9: Regular school holidays: Parental status effect

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns during normal school holidays in 2018, controlling for the parental status. *Holidays* is a dummy variable taking the value of 1 during the months of scheduled school holidays, and zero otherwise. All variable definitions are reported in Table 3. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Holidays | -0.37 | -0.37 | -0.37 | -0.37 | -0.38 | -0.38 |
| | (-1.56) | (-1.44) | (-1.59) | (-1.46) | (-1.53) | (-1.42) |
| Fraction_Parents · Holidays | -0.23 | -0.33 | | | | |
| | (-0.36) | (-0.61) | | | | |
| Fraction_Fathers · Holidays | | | -0.38 | -0.52 | -0.37 | -0.51 |
| | | | (-0.53) | (-0.86) | (-0.51) | (-0.83) |
| Fraction_Mothers · Holidays | | | 0.73 | 0.80 | 0.78 | 0.85 |
| | | | (1.15) | (1.18) | (1.27) | (1.31) |
| Fraction_Not_Fathers · Holidays | | | | | 1.05 | 1.08 |
| | | | | | (0.25) | (0.26) |
| Fraction_Not_Mothers · Holidays | | | | | -2.84 | -3.01 |
| | | | | | (-0.46) | (-0.50) |
| lnAUM | | 0.56 | | 0.56 | | 0.57 |
| | | (0.60) | | (0.59) | | (0.60) |
| Constant | 1.20*** | -1.22 | 1.20*** | -1.19 | 1.20*** | -1.23 |
| | (3.42) | (-0.30) | (3.43) | (-0.29) | (3.44) | (-0.30) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.11 | 0.12 | 0.11 | 0.12 | 0.11 | 0.12 |
| Nobs | 3615 | 3201 | 3615 | 3201 | 3615 | 3201 |

Table 10: Abnormal returns during school closure shock: Parents of young children

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2020 controlling for the parental status of fund managers with young children. The suffixes "_mean12" and "_min12" denote the average age of children being below 12, and the youngest child being below 12, respectively. All variable definitions are reported in Table 3. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| School_Closed | 2.12 | -0.59 | 1.95 | -0.90 | 1.90 | -0.99 |
| | (1.38) | (-0.28) | (1.21) | (-0.41) | (1.16) | (-0.44) |
| Fraction_Parents_mean12 · School_Closed | -6.76*** | -6.26** | | | | |
| | (-2.65) | (-2.30) | | | | |
| Fraction_Fathers_mean12 · School_Closed | | | -2.65 | -2.10 | | |
| | | | (-1.05) | (-0.72) | | |
| Fraction_Mothers_mean12 · School_Closed | | | -39.12*** | -41.49** | | |
| | | | (-2.94) | (-2.49) | | |
| Fraction_Fathers_min12 · School_Closed | | | | | -2.15 | -1.46 |
| | | | | | (-0.90) | (-0.49) |
| Fraction_Mothers_min12 · School_Closed | | | | | -36.99*** | -39.05** |
| | | | | | (-2.86) | (-2.39) |
| lnAUM | | 4.83 | | 4.80 | | 4.92 |
| | | (0.93) | | (0.95) | | (0.97) |
| lnConfirmed | | 0.54 | | 0.61 | | 0.61 |
| | | (1.16) | | (1.30) | | (1.30) |
| Constant | 0.44 | -27.46 | 0.50 | -28.10 | 0.44 | -28.66 |
| | (0.13) | (-1.12) | (0.15) | (-1.16) | (0.13) | (-1.18) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.13 | 0.18 | 0.14 | 0.20 | 0.14 | 0.20 |
| Nobs | 994 | 880 | 994 | 880 | 994 | 880 |

Table 11: Regular school holidays: Parents of young children

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns during normal school holidays in 2018, controlling for the parental status of managers with young children. The suffixes "_mean12" and "_min12" denote the average age of children being below 12, and the youngest child being below 12, respectively. *Holidays* is a dummy variable taking the value of 1 during the months of scheduled school holidays, and zero otherwise. All variable definitions are reported in Table 3. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Holidays | -0.39* | -0.41* | -0.40* | -0.41* | -0.41* | -0.42* |
| | (-1.78) | (-1.66) | (-1.79) | (-1.67) | (-1.79) | (-1.67) |
| Fraction_Parents_mean12 · Holidays | -0.07 | -0.15 | | | | |
| | (-0.10) | (-0.27) | | | | |
| Fraction_Fathers_mean12 · Holidays | | | -0.14 | -0.24 | | |
| | | | (-0.17) | (-0.38) | | |
| Fraction_Mothers_mean12 · Holidays | | | 0.40 | 0.46 | | |
| | | | (0.56) | (0.59) | | |
| Fraction_Fathers_min12 · Holidays | | | | | -0.05 | -0.14 |
| | | | | | (-0.07) | (-0.23) |
| Fraction_Mothers_min12 · Holidays | | | | | 0.47 | 0.53 |
| | | | | | (0.64) | (0.67) |
| lnAUM | | 0.56 | | 0.56 | | 0.56 |
| | | (0.59) | | (0.59) | | (0.59) |
| Constant | 1.20*** | -1.21 | 1.20*** | -1.20 | 1.20*** | -1.20 |
| | (3.39) | (-0.30) | (3.40) | (-0.30) | (3.39) | (-0.30) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.11 | 0.12 | 0.11 | 0.12 | 0.11 | 0.12 |
| Nobs | 3615 | 3201 | 3615 | 3201 | 3615 | 3201 |

## Table 12: Market performance during the financial crisis in 2008 and COVID-19 in 2020

This table reports the realized monthly log returns, intra-month daily return volatilities, and the percentage change of the volatility relative to the average values during benchmark periods. Panel A reports the statistics for the early months of the COVID-19 pandemic with the years 2018-2019 as a benchamark. Panel B reports the statistics for the months surrounding Lehman Brothers' bankruptcy, with 2005-2006 as a benchmark period. To proxy for performance of the stock, bond and other markets across the globe, we use the following indices: The S&P 500 Index, the EuroStoxx Index, the MSCI Emerging Market Index, the Merrill Lynch BBB US Corporate Bond Total Return Index, the S&P Eurozone Investment Grade Corporate Bond Index, the Bloomberg Aggregate Global Corporate Bond Index, the Dow Jones U.S. Real Estate Index, the S&P Global Macro Commodities Index, and the CBOE Volatility Index (VIX). For the VIX index, we repot in the last column the average values during the month instead of realized monthly returns, and the volatilities of the daily values instead of the volatility of returns.

| | | Stock markets | | | Bond markets | | | Real Estate | Commodities | VIX |
|---|---|---|---|---|---|---|---|---|---|---|
| | | US | Europe | Emerging Markets | US | Europe | Global | | | |
| Panel A: COVID-19 PANDEMIC | | | | | | | | | | |
| 2018-2019 | Mean monthly ret | 0.95 | 0.04 | -0.16 | 0.50 | -0.02 | 0.08 | 0.55 | -0.06 | 16.05 |
| | Mean daily return vol | 0.84 | 0.79 | 0.83 | 0.22 | 0.10 | 0.17 | 0.83 | 1.10 | 1.94 |
| Jan, 2020 | Realized monthly ret | -0.04 | -2.29 | -4.81 | 2.27 | 0.95 | 1.70 | 1.40 | -11.51 | 13.94 |
| | Daily ret vol | 0.75 | 0.70 | 0.97 | 0.24 | 0.11 | 0.19 | 0.73 | 0.99 | 1.99 |
| | % change in vol | -10.88 | -11.81 | 16.44 | 9.61 | 11.15 | 7.46 | -11.59 | -10.30 | 2.64 |
| Feb, 2020 | Realized monthly ret | -8.59 | -10.00 | -5.50 | 0.89 | -0.43 | 0.52 | -7.38 | -8.13 | 19.63 |
| | Daily ret vol | 1.58 | 1.45 | 1.26 | 0.24 | 0.09 | 0.18 | 1.69 | 1.43 | 8.33 |
| | % change in vol | 87.78 | 83.37 | 50.77 | 9.82 | -11.77 | 3.15 | 103.86 | 30.26 | 329.00 |
| Mar, 2020 | Realized monthly ret | -13.18 | -11.36 | -16.97 | -10.85 | -6.56 | -6.99 | -22.93 | -33.84 | 57.74 |
| | Daily ret vol | 5.93 | 4.21 | 3.69 | 1.52 | 0.58 | 1.14 | 6.98 | 4.32 | 14.56 |
| | % change in vol | 603.69 | 432.46 | 343.06 | 603.49 | 461.64 | 554.95 | 743.86 | 293.00 | 649.63 |
| Apr, 2020 | Realized monthly ret | 12.06 | 2.39 | 8.62 | 6.10 | 3.18 | 4.39 | 8.52 | 0.59 | 41.45 |
| | Daily ret vol | 2.58 | 2.00 | 1.52 | 0.56 | 0.26 | 0.37 | 3.68 | 4.32 | 6.22 |
| | % change in vol | 206.13 | 152.55 | 82.90 | 158.87 | 151.42 | 112.95 | 344.87 | 293.63 | 219.99 |
| May, 2020 | Realized monthly ret | 4.65 | 2.67 | 0.58 | 2.36 | 0.05 | 0.82 | 1.72 | 17.78 | 30.90 |
| | Daily ret vol | 1.45 | 1.75 | 1.32 | 0.36 | 0.17 | 0.27 | 2.36 | 2.01 | 3.14 |
| | % change in vol | 71.44 | 121.73 | 58.43 | 66.67 | 61.92 | 53.86 | 185.26 | 83.24 | 61.53 |
| Panel B: FINANCIAL CRISIS | | | | | | | | | | |
| 2005-2006 | Mean monthly ret | 0.81 | 0.93 | 2.17 | 0.23 | -0.21 | -0.19 | 1.25 | 1.39 | 12.79 |
| | Mean daily return vol | 0.63 | 0.80 | 0.86 | 0.24 | 0.12 | 0.16 | 0.94 | 1.40 | 0.97 |
| Aug, 2008 | Realized monthly ret | 1.44 | -4.95 | -8.57 | 0.66 | 0.82 | 0.45 | 1.69 | -7.09 | 20.70 |
| | Daily ret vol | 1.31 | 1.03 | 1.13 | 0.28 | 0.19 | 0.19 | 2.45 | 2.03 | 1.05 |
| | % change in vol | 108.95 | 29.47 | 30.82 | 17.52 | 58.72 | 20.90 | 159.97 | 44.36 | 8.20 |
| Sep, 2008 | Realized monthly ret | -9.33 | -14.08 | -19.49 | -5.41 | -2.86 | -5.70 | -1.67 | -12.93 | 30.30 |
| | Daily ret vol | 3.48 | 3.32 | 3.36 | 0.65 | 0.30 | 0.50 | 5.44 | 3.10 | 6.73 |
| | % change in vol | 454.35 | 317.13 | 288.81 | 175.47 | 160.96 | 222.12 | 476.58 | 120.75 | 593.69 |
| Oct, 2008 | Realized monthly ret | -18.39 | -22.48 | -32.16 | -11.65 | -1.14 | -4.82 | -37.97 | -32.53 | 61.18 |
| | Daily ret vol | 5.03 | 6.07 | 5.77 | 0.73 | 0.36 | 0.42 | 7.35 | 3.59 | 10.69 |
| | % change in vol | 703.05 | 662.14 | 567.16 | 205.74 | 206.53 | 169.18 | 680.03 | 156.04 | 1001.84 |
| Nov, 2008 | Realized monthly ret | -7.45 | -7.96 | -7.94 | 2.52 | 1.62 | 2.35 | -26.54 | -14.02 | 62.67 |
| | Daily ret vol | 4.47 | 4.61 | 3.43 | 0.53 | 0.19 | 0.28 | 8.31 | 3.96 | 8.18 |
| | % change in vol | 613.80 | 479.00 | 296.19 | 123.67 | 62.00 | 79.88 | 781.32 | 182.25 | 743.47 |
| Dec, 2008 | Realized monthly ret | 1.06 | 5.57 | 7.33 | 3.91 | 1.01 | 3.21 | 13.77 | -11.26 | 52.36 |
| | Daily ret vol | 3.13 | 3.17 | 2.49 | 0.44 | 0.26 | 0.27 | 9.13 | 3.77 | 8.29 |
| | % change in vol | 400.00 | 298.79 | 188.25 | 85.05 | 122.81 | 70.63 | 868.24 | 168.87 | 755.03 |

## Table 13: Abnormal returns during school closure shock: Attention-hungry vs. easy-to-monitor styles

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2020 controlling for parental status. Easy_Monitoring is a dummy variable that takes the value of one for those hedge funds styles that conventionally invest in the asset classes with less time-consuming monitoring process. Attention_Hungry is a dummy variable that takes the value of one for those hedge funds styles with more time-consuming monitoring process. All variable definitions are reported in Table 3. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| School_Closed | 3.22** | 0.52 | 3.13** | 0.50 | 3.04** | 0.40 | 2.14 | -0.67 |
| | (2.24) | (0.26) | (2.08) | (0.24) | (2.02) | (0.18) | (1.33) | (-0.30) |
| Fraction_Parents · School_Closed · Attention_Hungry | -12.97*** | -13.84*** | | | | | | |
| | (-3.15) | (-4.03) | | | | | | |
| Fraction_Parents · School_Closed · Easy_Monitoring | 0.50 | 2.03 | | | | | | |
| | (0.15) | (0.56) | | | | | | |
| Fraction_Mothers · School_Closed · Attention_Hungry | | | -26.97** | -26.64** | -26.70** | -26.20* | | |
| | | | (-2.15) | (-1.99) | (-2.11) | (-1.93) | | |
| Fraction_Mothers · School_Closed · Easy_Monitoring | | | -21.35** | -16.44* | -23.44*** | -17.43* | | |
| | | | (-2.59) | (-1.77) | (-2.98) | (-1.80) | | |
| Fraction_Fathers · School_Closed · Attention_Hungry | | | -8.46*** | -9.29*** | -7.62** | -8.59*** | | |
| | | | (-2.69) | (-3.40) | (-2.32) | (-2.99) | | |
| Fraction_Fathers · School_Closed · Easy_Monitoring | | | 2.07 | 3.27 | 1.58 | 3.10 | | |
| | | | (0.62) | (0.91) | (0.48) | (0.86) | | |
| Fraction_Not_Mothers · School_Closed · Attention_Hungry | | | | | -19.21 | -16.03 | | |
| | | | | | (-1.33) | (-1.18) | | |
| Fraction_Not_Mothers · School_Closed · Easy_Monitoring | | | | | 4.23 | 1.46 | | |
| | | | | | (1.62) | (0.12) | | |
| Fraction_Not_Fathers · School_Closed · Attention_Hungry | | | | | -6.40 | -1.80 | | |
| | | | | | (-1.17) | (-0.22) | | |
| Fraction_Not_Fathers · School_Closed · Easy_Monitoring | | | | | 4.36 | 3.25 | | |
| | | | | | (1.13) | (1.43) | | |
| Fraction_Mothers_min12 · School_Closed · Attention_Hungry | | | | | | | -42.27** | -47.75* |
| | | | | | | | (-2.15) | (-1.90) |
| Fraction_Mothers_min12 · School_Closed · Easy_Monitoring | | | | | | | -25.18*** | -20.68** |
| | | | | | | | (-3.80) | (-2.46) |
| Fraction_Fathers_min12 · School_Closed · Attention_Hungry | | | | | | | -6.79* | -7.18** |
| | | | | | | | (-1.94) | (-2.34) |
| Fraction_Fathers_min12 · School_Closed · Easy_Monitoring | | | | | | | 2.98 | 4.37 |
| | | | | | | | (0.75) | (1.01) |
| lnAUM | | 4.84 | | 5.01 | | 5.00 | | 4.84 |
| | | (0.94) | | (0.98) | | (0.99) | | (0.97) |
| lnConfirmed | | 0.51 | | 0.51 | | 0.51 | | 0.60 |
| | | (1.07) | | (1.08) | | (1.06) | | (1.27) |
| Constant | 0.51 | -27.14 | 0.62 | -27.81 | 0.65 | -27.77 | 0.39 | -28.21 |
| | (0.15) | (-1.11) | (0.18) | (-1.15) | (0.19) | (-1.16) | (0.12) | (-1.17) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.14 | 0.19 | 0.15 | 0.20 | 0.15 | 0.21 | 0.15 | 0.21 |
| Nobs | 994 | 880 | 994 | 880 | 994 | 880 | 994 | 880 |

Figure 1: Timeline of school closures across different countries

The figure depicts the timeline of COVID-19 related school closures throughout 2020 in the countries where managers are based in our sample. The color coding ranges from green for no school closures to red for full nation-wide school closure. The data are from the COVID-19 datahub https://covid19datahub.io/.

# When Paid Work Gives in to Unpaid Care Work: Evidence from the Hedge Fund Industry under COVID-19

## SUPPLEMENTARY RESULTS

In this appendix we tabulate supplementary robustness checks, which are discussed in the main body of the paper.

1. Table S1 compares the distribution of female managers in our sample with the population covered in AlphaMaven https://alpha-maven.com/ in terms of geographical distribution, age and education.
2. Table S2 reports the results where we include country and style fixed effects instead of fund fixed effects. This specification includes other fund-specific control variables, such as fees, as well as measures of female representation levels in funds.
3. Table S3 reports the results when we use only the sub-set of countries with male and female managers.
4. Table S4 reports the results using the sub-sample of funds, for which the R-squared of the first-stage return regression on the Fung & Hsieh (2001) factors is above 50%.
5. Table S5 reports the results using the sub-sample of funds, for which the estimated in-sample alpha of the first-stage return regression on the Fung & Hsieh (2001) factors is above the median.
6. Table S6 reports the results where we estimate ARs relative to ten industry portfolios of Fama and French (https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).
7. Table S7 reports the results where we estimate ARs relative to eight EurekaHedge hedge fund indices.
8. Table S8 reports the estimation results using a 36-month EP, Table S9 reports the results using minimum 24 and maximum 60 months in the EP, and Table S10 reports the results for minimum 36 and maximum 60 months in the EP.
9. Table S11 reports the results in October 2008 as a post-Lehman bankruptcy test.
10. Table S12 reports the results using the change in the abnormal return $\Delta AR_{it}$ as a dependent variable.
11. Table S13 reports the propensity score matching results.

12. Table S14 reports the simulation results for a hypothetical US-based manager who is using or is unable to use various market timing strategies during March 2020.

Table S1: Female managers sample representativeness

This table reports the distribution of female managers across different geographical locations, as well as their ages and educational characteristic in our sample and in AlphaMaven.

| | AlphaMaven | Our total sample |
|---|---|---|
| Number of Managers | 11,911 | 3,409 |
| % female managers | 0.13 | 0.14 |
| Geographical Distribution of Female Managers (% of total managers by region) | | |
| North America | 0.13 | 0.15 |
| Europe excl. UK | 0.10 | 0.11 |
| UK | 0.13 | 0.14 |
| Asia Pacific | 0.17 | 0.07 |
| ROW | 0.11 | 0.11 |
| Total | 0.13 | 0.14 |
| Biographical Information of Female Managers | | |
| Age characteristics | | |
| Min | 27.00 | 25.00 |
| Average | 42.54 | 42.11 |
| Median | 42.00 | 45.00 |
| Max | 64.00 | 75.00 |
| Distribution of female managers by educational achievement | | |
| Undergraduate Degree | 0.51 | 0.52 |
| Graduate Degree | 0.49 | 0.46 |
| Other | 0.00 | 0.02 |

Table S2: Including country and style fixed effects and fund-invariant control variables

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2020 for funds with different levels of female representation. Country and style fixed effects are included instead of fund fixed effects together with fund-invariant control variables. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time. Additional control variables include: a dummy that take the value of one if a fund is closed for new investments (Closed_Dummy), a dummy for whether a fund has a high-water mark (HWM), a dummy that takes the value of one if a fund reports using leverage (Leverage_Dummy), natural logarithm of the fund's minimum subscription amount, in million USD (lnMinInv), the length of the fund's lockup period in months (Lockup_Months), the fund's management fee in % (Management Fee); the minimum notice period (in days) before investors can redeem their shares in the fund (Notice Period), the fund's performance fee in % (Performance Fee), a dummy variable that takes the value of one if the number of active managers in the fund in a given month is more than one (Team).

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| School_Closed | 2.28* | -0.40 | 2.08 | -0.30 | 2.31* | -0.13 |
| | (1.70) | (-0.23) | (1.56) | (-0.17) | (1.78) | (-0.08) |
| IsFemale | 1.53* | 1.43 | | | | |
| | (1.76) | (1.42) | | | | |
| IsFemale · School_Closed | -9.71*** | -8.71** | | | | |
| | (-3.01) | (-2.17) | | | | |
| IsFemale50 | | | 1.63 | 2.33 | | |
| | | | (1.32) | (1.64) | | |
| IsFemale50 · School_Closed | | | -14.67*** | -15.16** | | |
| | | | (-3.21) | (-2.51) | | |
| Fraction_Females | | | | | 2.01 | 2.25 |
| | | | | | (1.29) | (1.34) |
| Fraction_Females · School_Closed | | | | | -16.82*** | -16.29** |
| | | | | | (-2.83) | (-2.30) |
| lnAUM | | 0.29 | | 0.27 | | 0.28 |
| | | (1.38) | | (1.43) | | (1.39) |
| lnConfirmed | | 0.52 | | 0.47 | | 0.48 |
| | | (1.33) | | (1.20) | | (1.21) |
| Team | | -0.11 | | -0.17 | | -0.12 |
| | | (-0.15) | | (-0.23) | | (-0.18) |
| Performance Fee | | 0.05 | | 0.05 | | 0.05 |
| | | (1.22) | | (1.26) | | (1.19) |
| Management Fee | | -0.29 | | -0.37 | | -0.34 |
| | | (-0.44) | | (-0.50) | | (-0.48) |
| Notice Period | | -0.00 | | -0.00 | | -0.00 |
| | | (-0.19) | | (-0.10) | | (-0.09) |
| HWM | | -0.23 | | -0.22 | | -0.21 |
| | | (-0.20) | | (-0.19) | | (-0.18) |
| Leverage_Dummy | | -0.41 | | -0.45 | | -0.43 |
| | | (-0.78) | | (-0.84) | | (-0.81) |
| Closed_Dummy | | -0.17 | | -0.16 | | -0.16 |
| | | (-0.20) | | (-0.18) | | (-0.19) |
| Lockup_Months | | -0.16 | | -0.15 | | -0.16 |
| | | (-1.47) | | (-1.57) | | (-1.51) |
| lnMinInv | | 0.10 | | 0.09 | | 0.09 |
| | | (1.08) | | (0.95) | | (1.00) |
| Constant | -0.24 | -4.98 | 0.14 | -4.09 | -0.07 | -4.33 |
| | (-0.10) | (-0.71) | (0.05) | (-0.57) | (-0.03) | (-0.60) |
| Country, Style, and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.03 | 0.06 | 0.04 | 0.06 | 0.03 | 0.06 |
| Nobs | 994 | 870 | 994 | 870 | 994 | 870 |

## Table S3: Countries with female fund managers

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2020 for funds with different levels of female representation. The sub-sample of funds includes only those which are based in countries where there is at least one fund with female managers. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| School_Closed | 4.44*** | 1.94 | 4.20*** | 1.99 | 4.51*** | 2.32* |
| | (6.04) | (1.57) | (5.92) | (1.50) | (5.80) | (1.85) |
| IsFemale · School_Closed | -10.71*** | -10.44** | | | | |
| | (-3.05) | (-2.61) | | | | |
| IsFemale50 · School_Closed | | | -15.25*** | -16.47*** | | |
| | | | (-3.18) | (-2.80) | | |
| Fraction_Females · School_Closed | | | | | -18.25*** | -19.16** |
| | | | | | (-2.83) | (-2.58) |
| lnAUM | | 4.46 | | 4.96 | | 4.70 |
| | | (0.81) | | (0.89) | | (0.85) |
| lnConfirmed | | 0.51 | | 0.43 | | 0.44 |
| | | (1.10) | | (0.92) | | (0.94) |
| Constant | 2.98 | -25.69 | 3.40 | -26.99 | 3.18 | -25.93 |
| | (1.17) | (-0.99) | (1.18) | (-1.03) | (1.19) | (-0.99) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.15 | 0.20 | 0.15 | 0.20 | 0.14 | 0.20 |
| Nobs | 913 | 808 | 913 | 808 | 913 | 808 |

## Table S4: Funds with the first-stage R-squared >50%

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2020 for funds with different levels of female representation. The sub-sample of funds includes only those with the R-squared of the first-stage return regression on the Fung and Hsieh (2001) factors above 50%. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| School_Closed | 3.23* | 0.83 | 2.71 | 0.50 | 3.07* | 0.92 |
| | (1.85) | (0.41) | (1.53) | (0.23) | (1.77) | (0.45) |
| IsFemale · School_Closed | -14.13*** | -14.15*** | | | | |
| | (-3.60) | (-3.14) | | | | |
| IsFemale50 · School_Closed | | | -18.91*** | -21.40*** | | |
| | | | (-3.53) | (-2.84) | | |
| Fraction_Females · School_Closed | | | | | -23.35*** | -25.51*** |
| | | | | | (-3.61) | (-3.32) |
| lnAUM | | 4.64 | | 5.45 | | 5.02 |
| | | (0.85) | | (0.97) | | (0.90) |
| lnConfirmed | | 0.60 | | 0.56 | | 0.56 |
| | | (1.24) | | (1.15) | | (1.16) |
| Constant | 0.42 | -28.13 | 0.80 | -31.44 | 0.58 | -29.45 |
| | (0.14) | (-1.09) | (0.24) | (-1.17) | (0.18) | (-1.12) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.16 | 0.23 | 0.16 | 0.23 | 0.16 | 0.22 |
| Nobs | 791 | 688 | 791 | 688 | 791 | 688 |

Table S5: Funds with the estimated alpha above the median

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2020 for funds with different levels of female representation. The sub-sample of funds includes only those with the in-sample estimated alpha relative to the Fung and Hsieh (2001) factors above the median. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| School_Closed | 3.15 | -1.23 | 1.86 | -2.28 | 2.84 | -1.24 |
| | (1.25) | (-0.57) | (0.71) | (-0.92) | (1.11) | (-0.56) |
| IsFemale · School_Closed | -13.25*** | -12.03*** | | | | |
| | (-4.90) | (-4.21) | | | | |
| IsFemale50 · School_Closed | | | -11.55*** | -11.39*** | | |
| | | | (-2.90) | (-3.06) | | |
| Fraction_Females · School_Closed | | | | | -19.16*** | -19.02*** |
| | | | | | (-2.88) | (-3.04) |
| lnAUM | | 2.65 | | 1.30 | | 2.30 |
| | | (0.21) | | (0.10) | | (0.18) |
| lnConfirmed | | 0.72 | | 0.70 | | 0.67 |
| | | (1.04) | | (1.02) | | (0.98) |
| Constant | -8.47 | -22.27 | -8.63 | -15.98 | -8.65 | -10.45 |
| | (-1.18) | (-0.41) | (-1.19) | (-0.29) | (-1.19) | (-0.18) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.16 | 0.24 | 0.14 | 0.22 | 0.14 | 0.23 |
| Nobs | 492 | 446 | 492 | 446 | 492 | 446 |

Table S6: Abnormal returns relative to Fama-French 10 industry portfolios

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2020 for funds with different levels of female representation. The abnormal returns are computed relative to the ten Fama-French industry portfolios. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| School_Closed | 2.54* | 1.93 | 2.45* | 1.97 | 2.65** | 2.21 |
| | (1.90) | (1.28) | (1.84) | (1.30) | (1.96) | (1.44) |
| IsFemale · School_Closed | -5.30*** | -5.52*** | | | | |
| | (-2.71) | (-2.80) | | | | |
| IsFemale50 · School_Closed | | | -8.27*** | -9.37*** | | |
| | | | (-3.03) | (-3.42) | | |
| Fraction_Females · School_Closed | | | | | -10.45*** | -11.58*** |
| | | | | | (-3.22) | (-3.50) |
| lnAUM | | 10.85*** | | 11.08*** | | 10.97*** |
| | | (3.33) | | (3.31) | | (3.34) |
| lnConfirmed | | 0.29 | | 0.26 | | 0.26 |
| | | (1.03) | | (0.91) | | (0.91) |
| Constant | 2.77 | -49.17*** | 2.94 | -49.79*** | 2.86 | -49.29*** |
| | (1.25) | (-3.42) | (1.27) | (-3.36) | (1.27) | (-3.40) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.36 | 0.36 | 0.36 | 0.37 | 0.36 | 0.37 |
| Nobs | 994 | 880 | 994 | 880 | 994 | 880 |

Table S7: Abnormal returns relative to EurekaHedge hedge fund indices

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2020 for funds with different levels of female representation. The abnormal returns are computed relative to eight EurekaHedge hedge fund indices, covering the major hedge fund strategies in our sample. These include: Arbitrage Hedge Fund Index, CTA/Managed Futures Hedge Fund Index, Commodity Hedge Fund Index, Emerging Markets Hedge Fund Index, Fixed Income Hedge Fund Index, Long-Short Equities Hedge Fund Index, Macro Hedge Fund Index, and Relative Value Hedge Fund Index. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| School_Closed | 2.37 | 0.62 | 2.57 | 0.98 | 2.68 | 1.05 |
| | (1.20) | (0.33) | (1.32) | (0.52) | (1.35) | (0.55) |
| IsFemale · School_Closed | -5.42** | -5.53** | | | | |
| | (-2.22) | (-2.11) | | | | |
| IsFemale50 · School_Closed | | | -12.47*** | -12.89*** | | |
| | | | (-3.42) | (-3.14) | | |
| Fraction_Females · School_Closed | | | | | -13.06*** | -13.07*** |
| | | | | | (-3.18) | (-2.75) |
| lnAUM | | 0.51 | | 0.81 | | 0.64 |
| | | (0.16) | | (0.24) | | (0.20) |
| lnConfirmed | | 0.48 | | 0.44 | | 0.45 |
| | | (1.44) | | (1.29) | | (1.31) |
| Constant | 0.89 | -8.27 | 1.18 | -8.99 | 1.02 | -8.36 |
| | (0.32) | (-0.56) | (0.40) | (-0.60) | (0.36) | (-0.57) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.19 | 0.19 | 0.20 | 0.20 | 0.19 | 0.19 |
| Nobs | 994 | 880 | 994 | 880 | 994 | 880 |

## Table S8: Estimation period of 36 months

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2020 for funds with different levels of female representation. The factor loadings on the Fung and Hsieh (2001) seven factors are estimated using 36 months of reported hedge fund returns prior to 2020. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| School_Closed | -0.28 | -2.20 | -0.35 | -2.08 | -0.21 | -1.85 |
| | (-0.22) | (-0.95) | (-0.27) | (-0.87) | (-0.17) | (-0.83) |
| IsFemale · School_Closed | -8.11*** | -10.40*** | | | | |
| | (-3.06) | (-2.67) | | | | |
| IsFemale50 · School_Closed | | | -13.64*** | -18.68*** | | |
| | | | (-3.50) | (-2.77) | | |
| Fraction_Females · School_Closed | | | | | -14.69*** | -20.09** |
| | | | | | (-2.75) | (-2.27) |
| lnAUM | | -4.64 | | -5.43 | | -4.89 |
| | | (-0.50) | | (-0.60) | | (-0.53) |
| lnConfirmed | | 0.51 | | 0.44 | | 0.45 |
| | | (0.83) | | (0.71) | | (0.72) |
| Constant | -0.52 | 29.43 | -0.22 | 33.47 | -0.41 | 31.14 |
| | (-0.20) | (0.77) | (-0.08) | (0.89) | (-0.15) | (0.82) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.19 | 0.08 | 0.20 | 0.09 | 0.19 | 0.08 |
| Nobs | 952 | 850 | 952 | 850 | 952 | 850 |

Table S9: Estimation period 24 – 60 months

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2020 for funds with different levels of female representation. The factor loadings on the Fung and Hsieh (2001) seven factors are estimated using 5-year period preceding 2020, with the minimum of 24 months of reported hedge fund returns.*, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| School_Closed | 1.41* | 1.62 | 1.42* | 1.76 | 1.48* | 1.85 |
| | (1.68) | (1.35) | (1.68) | (1.47) | (1.78) | (1.60) |
| IsFemale · School_Closed | -4.87*** | -5.24*** | | | | |
| | (-3.07) | (-3.30) | | | | |
| IsFemale50 · School_Closed | | | -8.80*** | -10.07*** | | |
| | | | (-3.69) | (-4.48) | | |
| Fraction_Females · School_Closed | | | | | -9.16*** | -10.56*** |
| | | | | | (-2.66) | (-3.09) |
| lnAUM | | 6.71* | | 6.95* | | 6.82* |
| | | (1.71) | | (1.81) | | (1.75) |
| lnConfirmed | | 0.29 | | 0.25 | | 0.26 |
| | | (1.09) | | (0.93) | | (0.96) |
| Constant | 1.18 | -30.01 | 1.37 | -30.62* | 1.25 | -30.12 |
| | (0.53) | (-1.64) | (0.58) | (-1.70) | (0.55) | (-1.65) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.27 | 0.31 | 0.27 | 0.32 | 0.27 | 0.31 |
| Nobs | 994 | 880 | 994 | 880 | 994 | 880 |

## Table S10: Estimation period 36 – 60 months

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2020 for funds with different levels of female representation. The factor loadings on the Fung and Hsieh (2001) seven factors are estimated using 5-year period preceding 2020, with the minimum of 36 months of reported hedge fund returns. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| School_Closed | 1.49* | 1.60 | 1.57* | 1.76 | 1.62* | 1.88 |
| | (1.70) | (1.31) | (1.78) | (1.44) | (1.88) | (1.63) |
| IsFemale · School_Closed | -4.75*** | -5.46*** | | | | |
| | (-2.74) | (-3.14) | | | | |
| IsFemale50 · School_Closed | | | -9.46*** | -10.93*** | | |
| | | | (-3.83) | (-3.96) | | |
| Fraction_Females · School_Closed | | | | | -9.63** | -11.59*** |
| | | | | | (-2.60) | (-2.86) |
| lnAUM | | 7.46 | | 7.04 | | 7.35 |
| | | (1.64) | | (1.60) | | (1.64) |
| lnConfirmed | | 0.31 | | 0.27 | | 0.28 |
| | | (1.15) | | (0.98) | | (1.01) |
| Constant | 1.15 | -33.57 | 1.36 | -31.37 | 1.23 | -32.73 |
| | (0.52) | (-1.60) | (0.58) | (-1.53) | (0.54) | (-1.58) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.27 | 0.31 | 0.28 | 0.32 | 0.27 | 0.31 |
| Nobs | 952 | 850 | 952 | 850 | 952 | 850 |

Table S11: Regression results using October 2008 as a post-Lehman bankruptcy shock month

This table reports the estimation results for the regression of the ex-post hedge fund abnormal returns in 2007-2008 for funds with different levels of female representation, where a month of October 2008 is used as a shock month of post-Lehman Brothers bankruptcy high market volatility. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Post_Lehman | 0.47 | 0.91 | -0.20 | 0.72 | -0.41 | 0.53 |
| | (0.53) | (0.89) | (-0.17) | (0.62) | (-0.34) | (0.44) |
| IsFemale · Post_Lehman | -1.79 | 1.71 | | | | |
| | (-0.71) | (0.68) | | | | |
| IsFemale50 · Post_Lehman | | | 9.19*** | 8.38*** | | |
| | | | (4.23) | (4.28) | | |
| Fraction_Females · Post_Lehman | | | | | 10.13*** | 8.97*** |
| | | | | | (6.88) | (6.78) |
| lnAUM | | 0.57 | | 0.58 | | 0.56 |
| | | (0.83) | | (0.84) | | (0.81) |
| Constant | -0.02 | -2.45 | -0.02 | -2.47 | -0.02 | -2.38 |
| | (-0.04) | (-0.77) | (-0.04) | (-0.78) | (-0.04) | (-0.76) |
| Fund FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.09 | 0.09 | 0.10 | 0.09 | 0.10 | 0.09 |
| Nobs | 3069 | 2306 | 3069 | 2306 | 3069 | 2306 |

## Table S12: Change in abnormal returns

This table reports the estimation results for the regression of the change in ex-post hedge fund abnormal returns in 2020 for funds with different levels of female representation. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% level respectively. t-statistics are in parentheses. Standard errors are double clustered by country and time.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| School_Closed | 4.63** | -0.47 | 4.27** | -0.54 | 4.62*** | -0.20 |
| | (2.60) | (-0.16) | (2.32) | (-0.18) | (2.65) | (-0.07) |
| IsFemale · School_Closed | -12.97*** | -12.43** | | | | |
| | (-2.87) | (-2.38) | | | | |
| IsFemale50 · School_Closed | | | -18.57*** | -19.52** | | |
| | | | (-2.94) | (-2.46) | | |
| Fraction_Females · School_Closed | | | | | -21.89** | -22.24** |
| | | | | | (-2.55) | (-2.18) |
| lnAUM | | -7.67 | | -7.18 | | -7.43 |
| | | (-0.89) | | (-0.83) | | (-0.86) |
| lnConfirmed | | 0.75 | | 0.67 | | 0.68 |
| | | (0.91) | | (0.82) | | (0.83) |
| Constant | 8.47* | 45.09 | 8.84* | 43.75 | 8.63* | 44.75 |
| | (1.78) | (1.24) | (1.88) | (1.19) | (1.83) | (1.23) |
| Fund and Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| R-sq | 0.04 | 0.06 | 0.04 | 0.06 | 0.04 | 0.06 |
| Nobs | 994 | 880 | 994 | 880 | 994 | 880 |

## Table S13: Propensity score matching results

This table reports the results from the propensity score matching, where funds with female managers (IsFemale=1) are matched to funds without female managers (IsFemale=0) based on an average abnormal return over a quarter prior to the shock-month. In 2020, the shock-month is the month of school closures. In 2008, the shock-month is defined as September 2008 when Lehman Brothers defaulted. AR stands for ex-post abnormal returns relative to the Fung and Hsieh (2001) seven factors. P-Score denotes the estimated average propensity score. Matched AR is the average abnormal return prior to the shock, which is used to construct the matches. p-value is the p-value for the two-sample t-statistic for the difference in mean AR between the two groups.

| Panel A: School Closures in 2020 | | | | |
|---|---|---|---|---|
| | N Pairs | IsFemale=1 | IsFemale=0 | p-value |
| AR | 39 | -7.35 | -0.39 | 0.06 |
| P-Score | 39 | 0.19 | 0.19 | 0.94 |
| Matched AR | 39 | 0.34 | 0.37 | 0.95 |
| Panel B: Lehman Brothers Bankruptcy in 2008 | | | | |
| AR | 29 | -4.08 | -4.36 | 0.95 |
| P-Score | 29 | 0.28 | 0.28 | 0.88 |
| Matched AR | 29 | 0.81 | 0.87 | 0.88 |

## Simulation results

To illustrate the potential mechanism underlying the decline in the abnormal returns, we provide several simple examples with a US-based manager who conventionally times the market on a daily basis. We consider the equity market (proxied by the returns on the S&P 500 Index), the bond market (proxied by the Merrill Lynch BBB US Corporate Bond Total Return Index), and the commodities market (the S&P Global Macro Commodities Index). We use the daily returns of the indices in 2018-2019 to estimate the alpha and the beta for a manager who follows different types of dynamic strategies, relative to the corresponding index based on monthly returns. We evaluate her abnormal returns in March 2020 under two scenarios: (1) the manager implements her dynamic strategy up until schools were nationally closed in the US on the 5th of March 2020 and then switches to a buy-and-hold strategy; (2) the manager continues the dynamic allocation throughout the whole month. Switching to a buy-and-hold strategy during times of personal strife is plausible. The evidence in Lu et al. (2016) suggests that when managers are distracted from work because of events such as marriage and divorce, they tend to invest more in index stocks and their performance is better explained by systematic factors, compared to their peers.

We consider two broad example strategies: loss reduction and partial hedging. Under the loss reduction strategy, a manager can perfectly predict the next market move and always earns 100% of the daily positive returns. She is also able to avoid either 50% of the daily losses, or 100% of the losses, or even gain 50% of the losses through short selling. Under the partial hedging strategy, the manager hedges the market risk, such that she reduces daily losses by 80% and daily gains by 70% or 75%. We then assess the abnormal performance of such strategy in March 2020 as follows:

1 Aggregate the daily returns of the manager in 2018-2019 to a monthly basis.

2 Estimate a simple market model with respect to the index of interest using the 2018-2019 data, obtain the alpha and beta estimates.

3 Compute the expected return of this manager in March 2020 given the estimated coefficients and the market return in March 2020.

4 Aggregate the daily returns of the manager in March 2020 to a monthly basis using each strategy and scenario in turn.

5 Compute abnormal returns as the difference between the realized and expected returns.

Table S14 reports the estimated in-sample alphas and market betas for these strategies using the 2018-2019 monthly returns, as well as the resulting expected, realized, and abnormal returns under the two scenarios in March 2020. Even the most conservative loss avoidance strategy in the equity market has an in-sample alpha of 3.73% and a market beta of 0.50. This yields an expected return of -2.88% during March 2020. Under scenario (1) where the manager moves to

a buy-and-hold strategy, the realized return in March 2020 is -10.96%, leading to an abnormal loss of 8.08%. Under scenario (2), a 50% loss avoidance strategy would lead to a 17.50% realized return and, hence, 20.38% of abnormal return. Under the partial hedging strategy with 80% loss reduction and 75% gain reduction, the in-sample alpha and beta are 0.37% and 0.20, respectively. These values match the average estimated alpha and market beta of the funds in our sample at 0.21% and 0.13, respectively. The expected return in March 2020 for this strategy is -2.27%. The realized return under scenario (1) of -13.00% leads to an even larger negative abnormal return at -10.73%, while fully implementing the dynamic strategy under scenario (2) results in -0.23% realized return and 2.04% of abnormal return. The magnitude of the abnormal returns is comparable with estimates using the bond market index. For the commodities market, which experienced a 33.84% loss in March 2020, the abnormal losses exceed 30%, illustrating very high opportunity costs to missing out on timing the market during periods of extremely negative returns.

Even though these numbers are obtained under a rather simplistic representation of the strategies, they illustrate that a 9% abnormal loss is not unlikely. Even higher abnormal losses may be suffered by skillful managers who otherwise would have been more than able to implement dynamic allocation strategies during times of high market volatility, but are restricted from doing so under the work/home conflict they endured with the unexpected pandemic-response policies.

It is worth noting that if a manager does not have any market timing skills and conventionally invests in the market index (buy-and-hold), the in-sample alpha and beta are zero and one, respectively. A manager is expected to earn the market return. Even if the manager is distracted by other duties during the lockdown, this does not have an effect on the expected performance. The manager still earns the market return as the strategy does not require any monitoring. Hence, in March 2020 such manager loses, as expected, -13.18% (using the equity index as an example), and the resulting abnormal return is zero.

## Table S14: Illustrative example – Market timing strategies

This table reports the example of performance of different market timing strategies implemented on a daily basis. Alpha and Beta are the estimated constant and the slope coefficient, respectively, based on monthly returns of the strategy during 2018-2019 relative to the corresponding index. $E[R]$ is the corresponding expected return in March 2020 for the strategy. $R_{NoTiming}$ is the realized monthly return of the manager who switches to a buy-and-hold strategy of the corresponding index after March 5th, 2020. $R_{Timing}$ is the realized return of the manager who continues to time the market in March 2020 in the same way as in 2018-2019. $AR_{NoTiming}$ and $AR_{Timing}$ are the corresponding abnormal returns. We use the S&P500 Index for the US equity market, the Merrill Lynch BBB US Corporate Bond Total Return Index for the US corporate bond market, and the S&P Global Macro Commodities Index to proxy for the performance of the commodity markets.

| Strategy name | In-sample estimates | | Mar 2020 | | | | |
|---|---|---|---|---|---|---|---|
| | Alpha | Beta | $E[R]$ | $R_{NoTiming}$ | $AR_{NoTiming}$ | $R_{Timing}$ | $AR_{Timing}$ |
| Panel A: EQUITY MARKET | | | | | | | |
| Buy and hold | 0.00 | 1.00 | -13.18 | -13.18 | 0.00 | -13.18 | 0.00 |
| Loss reduction | | | | | | | |
| 50% loss reduction | 3.73 | 0.50 | -2.88 | -10.96 | -8.08 | 17.50 | 20.38 |
| 100% loss reduction | 7.47 | 0.00 | 7.42 | -8.73 | -16.16 | 48.18 | 40.75 |
| Full loss reduction, 50% gains on short sales | 11.20 | -0.50 | 17.73 | -6.51 | -24.23 | 78.86 | 61.13 |
| Partial hedging | | | | | | | |
| 80% loss reduction, 70% gain reduction | 0.75 | 0.20 | -1.89 | -12.77 | -10.88 | 2.18 | 4.08 |
| 80% loss reduction, 75% gain reduction | 0.37 | 0.20 | -2.27 | -13.00 | -10.73 | -0.23 | 2.04 |
| Panel B: CORPORATE US BOND MARKET | | | | | | | |
| Buy and hold | 0.00 | 1.00 | -10.85 | -10.85 | 0.00 | -10.85 | 0.00 |
| Loss reduction | | | | | | | |
| 50% loss reduction | 0.93 | 0.77 | -7.38 | -10.85 | -3.47 | -1.56 | 5.82 |
| 100% loss reduction | 1.86 | 0.53 | -3.91 | -10.85 | -6.94 | 7.73 | 11.64 |
| Full loss reduction, 50% gains on short sales | 2.79 | 0.30 | -0.44 | -10.85 | -10.41 | 17.02 | 17.46 |
| Partial hedging | | | | | | | |
| 80% loss reduction, 70% gain reduction | 0.19 | 0.25 | -2.56 | -11.49 | -8.93 | -1.40 | 1.16 |
| 80% loss reduction, 75% gain reduction | 0.09 | 0.23 | -2.37 | -11.54 | -9.17 | -1.78 | 0.58 |
| Panel C: COMMODITIES MARKET | | | | | | | |
| Buy and hold | 0.00 | 1.00 | -33.84 | -33.84 | 0.00 | -33.84 | 0.00 |
| Loss reduction | | | | | | | |
| 50% loss reduction | 4.37 | 0.60 | -16.00 | -33.84 | -17.84 | -7.07 | 8.93 |
| 100% loss reduction | 8.75 | 0.20 | 1.84 | -33.84 | -35.68 | 19.71 | 17.87 |
| Full loss reduction, 50% gains on short sales | 13.12 | -0.19 | 19.68 | -33.84 | -53.52 | 46.48 | 26.80 |
| Partial hedging | | | | | | | |
| 80% loss reduction, 70% gain reduction | 0.87 | 0.22 | -6.58 | -36.51 | -29.92 | -4.80 | 1.79 |
| 80% loss reduction, 75% gain reduction | 0.44 | 0.21 | -6.68 | -36.70 | -30.02 | -5.78 | 0.89 |