Family ties and insider trading: A closer look at family firms

Stefan Morkoetter [a]
Tobias H. Schori [b *]
Thomas Zellweger [c]

November 2019
(First version: August 2017)

Abstract

We study insider trading in family firms and compare the profitability of insider purchases and sales of family insiders, i.e. insiders who are related to the founding family, to those of nonfamily insiders, i.e. insiders without such family ties. Probing a sample of 37,012 insider trades from 241 family firms, we find that family insiders generate higher abnormal returns compared to nonfamily insiders for insider purchases. For insider sales, transactions that imply significant litigation and reputational risks, the profitability is significantly lower for family insiders compared to nonfamily insiders. We also distinguish between family insiders who are actively involved in the firm and family insiders who are significant shareholders but not otherwise involved in the firm. The profitability of insider sales is significantly higher for family insiders without management involvement, who are thereby under less regulatory scrutiny, compared to insider sales by family insiders with an active management role.

Keywords: *Insider trading, family firms*

JEL Codes: G14, G30

---

[a] University of St. Gallen, The St.Gallen Institute of Management in Asia, 111 Amoy Street, Singapore 069931; stefan.morkoetter@unisg.ch
[b] University of St. Gallen, The St.Gallen Institute of Management in Asia, 111 Amoy Street, Singapore 069931; tobias.schori@unisg.ch
[c] University of St. Gallen, Center for Family Business, Dufourstrasse 40a, 9000 St.Gallen, Switzerland; thomas.zellweger@unisg.ch
*Corresponding author

1 INTRODUCTION

Insider trading studies show that insiders are able to generate abnormal returns and achieve personal gains by exploiting information asymmetries based on material, non-public information (Kallunki et al., 2016; Agrawal & Cooper, 2015; Hillier et al., 2015; Lakonishok & Lee, 2001). Concurrently, insiders are also under scrutiny by regulators and corporate governance bodies that seek to ensure compliance of insider trading since engaging in insider trading for personal benefits can result in significant legal and reputational risks for insiders as well as firms (Dai et al., 2016; Knewtson & Nofsinger, 2014; Bettis et al., 2000).

Family firms offer a particularly interesting context to investigate the profitability of insider trading, because despite regulatory and public scrutiny, family firms have been found to be particularly prone to certain forms of insider trading. Because the family serves as a controlling owner and family members are often engaged in the board and other top management positions information leakages are not unlikely (Sun & Yin, 2017; Anderson et al., 2012). For instance, family firms have been found to exhibit higher volumes of abnormal short selling activities prior to negative earnings announcements compared to nonfamily firms (Anderson et al., 2012). Moreover, family firms also exhibit higher abnormal short sales volumes prior to insider sales compared to nonfamily firms (Sun & Yin, 2017).

While these studies shed new light on insider activities and information leakages in family firms, a central question remains unaddressed: where does the insider trading within family firms originate from? While Sun and Yin (2017) show that abnormal short selling volumes in family firms are higher around insider sales, they do not offer empirical evidence with respect to the identity of the short-seller. Similarly, while Anderson et al. (2012) show that family firms are more prone to informed trading via short sales compared to nonfamily firms, they do not empirically distinguish between short sales executed by insiders who are part of the founding family (whom we label family insiders) and insiders who are not part of the founding family (whom we label nonfamily insiders). Hence, research today does not provide sufficient information about which group of insiders exploits information advantages in family firms.

These gaps in the literature are noteworthy since a priori there are arguments to suggest that either family insiders or nonfamily insiders are at the origin of increased levels of

insider trading in family firms. On the one hand, family insiders could use their family relationships as informal channels for information leakage. Family insiders could exploit the close ties within the family and secure privileged access to information about the firm and may misuse that information for their own private benefit (Anderson et al., 2012). Indeed, family ties often involve trust-based interactions, typically in the form of regular exchanges of private information between the family members (Cruz et al., 2010). Moreover, due to the parallel presence of family members in ownership and management (Villalonga & Amit, 2006), family members present in management may leak privileged information to family relatives who are not in management but who are insiders because of their ownership stakes. On the other hand, nonfamily members in family firms may be more prone to engage in insider trading because of diverging values and interests between family members and nonfamily members (Sun & Yin, 2017). Moreover, nonfamily insiders, in particular those involved in firm operations, have an immediate access to privileged information about the firm so that they are in a particularly privileged position to exploit information advantages (Wang et al., 2012).

We contribute towards answering these gaps in the literature by explicitly distinguishing between family versus nonfamily status of insiders in family firms and link this status to the profitability of their insider sales and purchases. We further unpack the origin of insider trading activity by distinguishing between two types of family insiders: family corporate insiders and family non-corporate insiders. In consequence, we explore the profitability of insider purchases and sales of four distinct types of insiders in family firms, i.e. (1) family corporate insiders and (2) family non-corporate insiders on the one hand, and (3) nonfamily corporate insiders just as (4) nonfamily non-corporate insiders on the other (see Appendix 1). With our definition of an *insider*, we follow the legal definition provided by the Securities and Exchange Commission (Section 16(a) of the Securities Exchange Act of 1934) which suggests that all directors or officers in the firm as well as shareholders with an ownership stake of at least 10% are considered insiders and are required to disclose their trading activities to the regulatory authorities.

We use insider trading data reported between 2005 to 2015 from the Securities and Exchange Commission (SEC) for publicly traded U.S. family firms in the S&P 1500 listed at the beginning of 2005. We identified 241 family firms which reported 37,012 open-market

insider purchases and insider sales (on trading day level) that were transacted between 2005 and 2015. Our study has three main findings. *First*, we find that family insiders earn significantly higher abnormal returns when purchasing firm shares compared to nonfamily insiders. *Second*, in contrast to insider purchases, we show that the profitability of insider sales completed by family insiders is significantly lower compared to insider sales by nonfamily insiders. As insider sales involve significantly higher legal and reputational risks than purchases, family insiders seem to refrain from exploiting their information advantages when selling shares but are less hesitant to do so when purchasing shares. *Third*, we find that the profitability of insider sales by family non-corporate insiders is significantly higher compared to that of family corporate insiders. In contrast, the profitability of insider purchases does not significantly differ between family non-corporate insiders and family corporate insiders. While (family) non-corporate insiders are not involved in the strategic management of the firm and thus have less access to privileged information (Lakonishok & Lee, 2001), they are also under less public and firm-internal scrutiny (Anderson et al., 2012). Our findings suggest that family relationships potentially work as informal information channels where family non-corporate insiders gain access to material, non-public information, otherwise not readily available to non-corporate insiders. The reduced scrutiny potentially offers family non-corporate insiders an opportunity to exploit information asymmetries when selling firm shares thereby avoiding the related legal and reputational consequences. Leaking information to family non-corporate insiders who are under lower scrutiny may be less valuable when purchasing firm shares as compared to when selling firm shares since timing insider purchases implies lower legal and reputational risks (Dai et al., 2016). Our main findings are consistent across different investment horizons and also when including firm fixed effects to control for unobserved firm-level heterogeneity. Furthermore, our results are economically and statistically stable for different definitions of the benchmarks used to calculate abnormal returns.

With these findings we wish to make two key contributions to the literature. *First*, we contribute to research on insider trading heterogeneity (e.g. Kallunki et al., 2018; Kallunki et al., 2016; Hillier et al., 2015) and provide empirical evidence that personal linkages of insiders to the company's controlling owners can significantly alter insider trading profitability. Family and nonfamily insiders are two separate insider groups that have distinct sets of per-

sonal values, motives and attitudes toward risk (Gomez-Mejia et al., 2007), which significantly affects their insider trading activity. *Second*, we contribute to research on insider activities and informed trading within family firms (Sun & Yin, 2017; Anderson et al., 2012). While these studies show that, on the firm-level, family firms are more prone to insider activities compared to nonfamily firms, we further unpack the origin of insider trading within family firms. By differentiating between four types of insiders who vary along their family affiliation (yes/no) as well as their active involvement in the family firm (yes/no), we provide more nuanced evidence about the origin and profitability of insider activities and information exploitation in family firms.

The rest of our study is structured as follows. In section 2, we review the relevant literature and develop our hypotheses for insider trading in family firms. Section 3 describes our sample and the methodology. Section 4 discusses the descriptive and regression results. Section 5 includes robustness tests, while section 6 concludes.

2 LITERATURE AND HYPOTHESIS DEVELOPMENT

2.1 Insider heterogeneity in family firms

While research provides evidence that insiders are able to generate abnormal returns based on their information advantages (Lakonishok & Lee, 2001), literature emphasizes that insiders should not be treated as a homogenous group. For instance, personal characteristics, such as age and gender (Hillier et al., 2015), an insider's personal wealth (Kallunki et al., 2018), individual ethical misconduct (Kallunki et al., 2016) or the degree of an insider's information access and his exposure towards external scrutiny (Knewtson & Nofsinger, 2014; Wang et al., 2012) are all factors that can affect an insider's disposition towards exploiting information asymmetries.

We expect that the heterogeneity in the profitability of insider trading within family firms will vary along two dimensions along which insiders in family firms typically vary, and which should alter the insiders' propensity to exploit information advantages: (1) the insider's family member status, that is whether he/she is member of the founding family, and (2) whether the insider is actively involved in the management of the firm, either as a director or an officer, or just holds a substantial fraction of the shares and is otherwise not involved in the firm.

First, and regarding family members status, family firm boards typically consist of both members who are related to the founding family of the family firm (i.e. family insiders) and members without such family affiliation (i.e. nonfamily insiders) (Anderson & Reeb, 2003). For instance, Anderson and Reeb (2004) find that in their sample of S&P 500 firms, family members held close to 20% of all board seats in family firms. Moreover, Villalonga and Amit (2006) observe that 26% of all Fortune 500 firms in their sample employed at least one family officer and one family director. Importantly, the presence of family directors and managers significantly alters firm performance (Amore et al., 2017; Cucculelli & Micucci, 2008; Miller et al., 2007), lending support to the notion that many family insiders play a decisive role in firm management. Moreover, family insiders typically hold a larger ownership stake in the firm than nonfamily insiders (Anderson et al., 2009). Finally, and in contrast to their nonfamily counterparts, family insiders are not only concerned with their financial wealth but also with socioemotional returns from owning the firm, such as reputational benefits and the opportunity to uphold family control over generations (Gomez-Mejia et al.,

2007; Zellweger et al., 2012). Together, these observations suggest that family insiders represent a particular class of insiders with heightened level of control and idiosyncratic goals, which should improve their access to privileged information and alter their propensity to exploit such information advantages via insider trading (Hillier et al., 2015; Knewtson & Nofsinger, 2014).

Second, and regarding an insider's involvement in management, insider trading literature traditionally focusses on corporate insiders, hence insiders that are either directors and/or officers in the firm. We expand this line of research by investigating the relevance of non-corporate insiders, a type of insider that so far has only received limited attention in the literature. Non-corporate insiders are neither engaged in the board nor the management but hold a substantial ownership stake and thus are still required by the regulator to report their insider activities. Lakonishok and Lee (2001) and Seyhun (1986) compare the insider trading behaviour between corporate insiders and non-corporate insiders and conclude that trading by non-corporate insiders tends to be less informative because they are not part of the decision-making process in the firm. However, these studies do not analyze situations where personal relationships, such as familial ties, between insiders may allow information leakages of material, non-public information between corporate insiders and non-corporate insiders (Sun & Yin, 2017). The limited attention given to non-corporate insiders is particularly problematic in the context of family firms. Especially in later generation family firms, some family members may work inside the firm, while others may simply hold an important fraction of firm shares, which they have inherited from the previous generation, but are not otherwise involved in the firm (i.e. passive family shareholders; Zellweger, 2017). These family non-corporate insiders may benefit from their personal connections to the family corporate insiders, which grants them access to privileged information and private knowledge about the company's future without being actively involved in management (Anderson et al., 2012). Thus, while literature suggests that insider trading of non-corporate insiders is less informative due to the lack of access to privileged information, this may not necessarily be true for family non-corporate insiders. We therefore include non-corporate insiders in our analysis to account for personal connections and potential information leakages between corporate insiders and non-corporate insiders in family firms.

As a result, we distinguish between four types of insiders in family firms, i.e. *family corporate insiders, family non-corporate insiders, nonfamily corporate insiders* and *nonfamily non-corporate insiders* (see Appendix 1).

2.2 Insider purchases

We conjecture that the profitability of insider purchases by family insiders is higher than that of nonfamily insiders, for the following three reasons[1]. First, family insiders should be able to benefit from a particularly privileged information access, which provides them with important opportunities to exploit information asymmetries. Due to their personal relationships with the controlling owners, family insiders should be able to benefit from an informal information exchange within the family, which consists of both family members who are actively involved in the operations just as family non-corporate owners, which provides them with detailed access to various sources and types of private trusted information about the firm (Anderson et al., 2012). Second, while suspicions about illegal insider purchases can occasionally lead to regulatory investigations (Cheng & Lo, 2006), family insiders may act more opportunistically than nonfamily insiders because the risk of detrimental personal consequences, such as termination of employment, is lower compared to that of nonfamily insiders (Gomez-Mejia et al., 2001). In contrast, nonfamily insiders are more concerned with their personal career development inside the firm and their labor market prospects outside the firm (Chen et al., 2008), which should tamper their propensity to exploit information asymmetries via insider trading. Finally, insiders are generally less likely to buy firm shares if they have high ownership stakes in the firm because this would lead to an even more concentrated portfolio (Franco et al., 2017). Since family insiders tend to already have highly concentrated holdings in the family firm (Anderson et al., 2009), they may only engage in insider purchases when they are able to purchase based on privileged, non-public information to compensate for an increase in concentration risk.

[1] In this study, the terms insider purchase and insider sale refer to open-market transactions only. Therefore, the following statements refer only to such open-market transactions and may not be fully applicable to other insider transactions (such as option exercises or grants).

The moderating effect of non-corporate insider status amongst family insiders

We further conjecture that insider purchases by family non-corporate insiders will reach lower profitability than insider purchases by family corporate insiders. Corporate insiders generally have better access to privileged information compared to non-corporate insiders (Lakonishok & Lee, 2001; Seyhun, 1986). Concomitantly, family corporate insiders involved in the strategic decision-making process possess non-public information, which they can use when purchasing firm shares and we expect that family corporate insiders are particularly prone to exploit such information asymmetries. In contrast, family non-corporate insiders depend on information provided by family corporate insiders and thereby have no direct access to material, non-public information. Even though family non-corporate insiders may be under less regulatory scrutiny and could exploit such situations for private benefits (Anderson et al., 2012), their reduced scrutiny by regulators is of limited value for insider purchases, given that the legal and reputational consequences of insider purchases are limited (Cheng & Lo, 2006). Thus, family non-corporate insiders with their indirect access to privileged information should be in a more disadvantageous position in comparison to family corporate insiders when executing insider purchases.

2.3 Insider sales

In comparison to insider purchases, the legal and reputational risks as well as the probability of litigations and legal costs, are significantly higher for insider sales (Kallunki et al., 2018; Dai et al., 2016; Rogers, 2008; Cheng & Lo, 2006). The risks implied in insider sales are particularly high because outside investors may realize actual losses when share prices drop whereas insider purchases only result in opportunity costs for outside investors (Lee et al., 2014)[2].

[2] Coff and Lee (2003) argue that insider purchases may be a valid mechanism for rent appropriation with limited costs to shareholders. Because insider purchases represent a positive buying signal to the market, the value of the stock increases after the insider purchase transaction is made public. The full disclosure of the insider's information on which the insider initially traded on will further increase the share price. Outside investors who owned shares prior to the insider purchase will benefit fully from the share price increase. In addition, outside investors who bought shares after the insider purchase will have lower but still positive gains, as share prices increased after the insider purchase. Without the positive signaling, outside investors would however have benefited less and not at all, respectively.

We argue that family insiders are less prone than nonfamily insiders to exploit information advantages when selling firm shares. Even though family insiders may possess material, non-public information, they may refrain from exploiting such information advantages when selling firm shares. First, family insiders should refrain from selling shares based on material, non-public information because besides personal legal consequences (Anderson et al., 2012; Rogers, 2008), under the Insider Trading and Securities Fraud Enforcement Act (ITSFEA), firms can also be held liable for the misuse of material, non-public information of insiders if corporate governance policies fail to prevent such misuse (Dai et al., 2016; Kallunki et al., 2016; Garfinkel, 1997). For family insiders, the legal risk for insider sales is therefore not limited to personal litigation risks but extends to their own and their relatives' wealth embedded in the firm, which often consists of large, undiversified equity holdings (Anderson et al., 2009). Therefore, family wealth concentrated in the family firm may significantly decrease a family insider's willingness to engage in informed insider selling (Kallunki et al., 2018).

Second, the reputational risks tied to insider sales (Kallunki et al., 2016) should be more relevant for family insiders than for nonfamily insiders. Because the preservation of reputation is a main concern for family business owners (Villalonga et al., 2015), a loss of reputation can lead to long-lasting consequences for the family firm and its owners, whereby the misdeeds by one family insider spill over to the rest of the family and to the firm (Anderson & Reeb, 2003). Put differently, the reputational risks tied to insider sales threaten the socioemotional wealth that the family has vested to the firm, which is of predominant concern for family insiders but not for nonfamily insiders.

Finally, the public scrutiny linked to insider sales, which can result in insiders refraining from timing their trades (Wang et al., 2012), should be more relevant for family insiders compared to nonfamily insiders. Insiders in pivotal positions are under particularly intense scrutiny by shareholders and the public (Knewtson & Nofsinger, 2014), especially in the case of insider sales (Cheng & Lo, 2008). Family insiders often hold key positions and have a significant influence on strategic decision-making in family firms (Anderson et al., 2009; Anderson & Reeb, 2003). Thus, we conjecture that family insiders should be under particularly high public scrutiny due to their personal relationship with the founding family, which

should make them sensitive towards avoiding a public perception that information advantages were unduly exploited (Garfinkel, 1997).

The moderating effect of non-corporate insider status amongst family insiders

We further conjecture that the non-corporate insider status will *positively* influence the profitability of insider sales of family insiders, so that insider sales of family non-corporate insiders will be more profitable compared to those of family corporate insiders. As it is the case for insider purchases, corporate insiders have better access to privileged information within the firm, compared to non-corporate insiders when selling firm shares (Lakonishok & Lee, 2001). Family corporate insiders, being actively involved in the family firm management, should also possess more valuable information, compared to family non-corporate insiders who may only obtain indirect access to privileged information. However, in contrast to insider purchases, the legal and reputational risks implied in insider sales are more pronounced (Kallunki et al., 2016; Dai et al., 2016). Because of their privileged access to non-public information, corporate insiders tend to be intensely scrutinized by shareholders, regulators and the public which could reduce their propensity to opportunistically time their insider sales (Dai et al., 2016; Knewtson & Nofsinger, 2014; Wang et al., 2012). Family corporate insiders in particular may refrain from opportunistically selling firm shares because they are under pronounced public scrutiny and the legal and reputational consequences can be particularly relevant for family corporate insiders. In contrast, non-corporate family insiders may be subject to less scrutiny, compared to family corporate insiders (Anderson et al., 2012) and may be willing to extract private benefits if there is a lack of appropriate monitoring mechanisms (Anderson & Reeb, 2004). Thus, while family corporate insiders may refrain from timing insider sales, the reduced regulatory scrutiny imposed on family non-corporate insiders in combination with an indirect access to insider information via their relatives working inside the firm, should result in a more advantageous position for family non-corporate insiders to exploit information advantages when selling firm shares, compared to family corporate insiders.

3 SAMPLE & METHODOLOGY

3.1 Sample

We applied two iterative steps to compile a comprehensive set of insider trading data in family firms. First, we identified all family firms which were listed in the S&P 1500 at the beginning of 2005. Second, we then retrieved all insider trading data linked to these previously identified family firms which were filed during the period of 2005 until and including 2015 through the SEC. We collected insider trading data starting in 2005 to eliminate potential confounding effects on insider trading due to reporting policy changes as part of the Sarbanes-Oxley Act (Cao et al., 2015; Hillier et al., 2015; Knewtson & Nofsinger, 2014, Jagolinzer et al., 2011). Since there is a relatively high level of transparency with regards to insider trading in the U.S. and strict law enforcement with high penalties if convicted of criminal activities (Kallunki et al., 2016), we expect the ratio of complete and accurate reports filed through the SEC to be high[3].

Following previous research on insider trading in family firms (Anderson et al., 2012), we define a family firm as a firm where the founder or the founder's descendants and heirs (either by blood or marriage) own at least a combined 5% equity stake in the family firm. The family firm definition for the sample does not specifically require family members to be concurrently on the firm's board or in the firm's management (Anderson et al., 2012). To determine the family founder(s) and descendants as well as their individual firm ownership stakes in the initial S&P 1500 sample, we hand-collected detailed company history data for the entire S&P 1500 sample using external sources such as FundingUniverse.com, Bloomberg, Financial Times as well as the company's individual websites. These initial findings were then matched and manually enhanced with information as reported in the company's official proxy statements (form DEF-14A) to verify the initial findings as well as to calculate total family beneficial ownership (Anderson & Reeb, 2003). Family ownership was calculated by cumulating the number of shares held by each individual family member divided by the total shares outstanding. About 15% of the family firms employ a dual-class

[3] Despite the benefits of the sample, the data however does not include insider activity which was not regularly reported and officially filed through the SEC. Even though insiders are legally required to timely report their insider transactions, certain insiders arguably either decide not to disclose their transactions at all or to transact through intermediaries, thereby avoiding the disclosure requirements. This caveat also applies to other studies which empirically analyze insider trading activity (Agrawal & Nasser, 2012; Lee, 1997; Seyhun, 1992).

share structure. In such cases, we calculated family ownership by dividing the cumulative individual ownership rights across each separate share class by total shares outstanding across all share classes. Lastly, we excluded regulated firms in the financial services sector where government regulations may affect ownership structures as well as insider trading (Dai et al., 2016; Gider & Westerheide, 2016; Anderson et al., 2012). Family firms were allowed to exit the sample during the observation period in order to control for potential survivorship bias.

Next, we retrieved cleaned insider trading data for open-market purchases and open-market sales during the years of 2005 until 2015 via the Wharton Research Database (WRDS). Notably, insider trading data may include various forms of transactions, such as grants, equity swaps, gifts, derivatives as well as open-market transactions. However, we restricted the sample to open-market purchases and sales because such transactions have been previously reported to contain more private information about the actual motives of the transaction itself (Cao et al., 2015; Ravina & Sapienza, 2010; Kahle, 2000). To ensure data accuracy and consistency of the insider filings, we applied three data transformation and cleansing steps. First, multiple purchases or multiple sales of one particular insider within a specific firm on a single transaction day were cumulated to one single day-trade (Sun & Yin, 2017; Hillier et al., 2015; Wang et al., 2012; Fidrmuc et al., 2006). Because the underlying motivation of the trade as well as the implied potential informational advantage is likely to be similar for those trades, treating multiple day-transactions of a single insider as separate trades would potentially overestimate the statistical significance of abnormal returns (Cao et al., 2015; Hillier et al., 2015). Second, transactions with insufficient data and transactions which could not be complemented with accurate data required for the control variables were dropped from the sample. Third, we dropped insider transactions whose trade price as reported by the insiders to the regulator was not within 25% of the official closing price of that day (Knewtson & Nofsinger, 2014; Lakonishok & Lee, 2001)[4]. These steps lead to a final sample of 37’012 insider transactions in family firms.

[4] Excluding transactions where the transaction day closing price is lower than USD 2.00 (Hillier et al., 2015) did not alter the significance of our main findings. Excluding transactions that involved less than 100 shares (Lakonishok & Lee, 2001; Seyhun, 1986) did also not affect the significance of our findings. When we excluded trades where the reported transaction size is higher than the total number of shares outstanding, our results also remained statistically stable (Lakonishok & Lee, 2001). Including insider transactions whose trade price as

3.2 Methodology

We estimated linear parametric models using ordinary least squares in which the dependent variable $BHAR$ measures the buy-and-hold abnormal return following an insider trading over 120 trading days. We first calculated a baseline model (model 1). In a second model (model 2), we also tested our hypotheses using firm fixed effects to rule out the possibility that the results are driven by unobserved firm characteristics unrelated to family relationship effects. For example, firm-specific black-out periods (Bettis et al., 2000) and insider trade policies such as prior corporate governance approval (Jagolinzer et al., 2011) may affect an insider's propensity to exploit information asymmetries when purchasing and selling firm shares.

We started with estimating the following baseline model (model 1) for purchase and sale transactions separately, where *i* denotes insider, *j* denotes firm, and *t* denotes day. γ_{ijt} is a vector of insider, trade and firm observable characteristics as well as year and industry dummies.

$$BHAR_{ijt} = \beta_1(\textit{Family member}) + \beta_2(\textit{Non-corporate insider}) + \beta_3(\textit{Family member*Non-corporate insider}) + \gamma_{ijt} + \varepsilon_{ijt} \quad (1)$$

We next added firm fixed effects, ϑ_j, to the model (model 2). We defined μ_{it} as a vector of insider and trade observable characteristics as well as year dummies and thereby did not include firm observable characteristics and industry dummies since we controlled for firm fixed effects.

$$BHAR_{ijt} = \beta_1(\textit{Family member}) + \beta_2(\textit{Non-corporate insider}) + \beta_3(\textit{Family member*Non-corporate insider}) + \mu_{it} + \vartheta_j + \varepsilon_{ijt} \quad (2)$$

The insider characteristics we included were three dummy variables (i.e. CEO, CFO and Chairman) to capture the insider's role in the firm (Hillier et al., 2015). The trade characteristics were uncertainty, momentum and trade size (Kallunki et al., 2016; Reeb et al., 2014).

reported by the insiders was not within 25% of the official closing price of that day slightly improved the significance of our main findings for insider purchases. However, Lakonishok and Lee (2001) argue that including such cases can be problematic. Thus, we applied a more conservative data selection procedure.

The firm-level characteristics we included in model 1 were firm size, firm profitability and firm valuation (Gider & Westerheide, 2016; Hillier et al., 2015; Lakonishok & Lee, 2001). All regressions include year dummies to control for time trends in the stock market.

3.3 Variable definitions

3.3.1 Dependent variable

The primary dependent variable is the buy-and-hold abnormal (BHAR) stock return of insider transactions of insiders in family firms. The variable was computed as the difference between the buy-and-hold stock return and the risk-adjusted expected stock return based on the CAPM model. To test the robustness of our results and following other research on insider trading (Dai et al, 2016; Ravina & Sapienza, 2010), we computed the BHAR using the Fama-French 3-factor model (Fama & French, 1992) as well as the Carhart 4-factor model (Carhart, 1997) (for details refer to robustness test section).

3.3.2 Independent variable

In our study, the main independent variable "family member" estimates the impact of family firm affiliation of insiders on the profitability of insider trading. To analyze whether an insider is part of the founding family and thus has a family firm affiliation, we conducted an extensive name-matching exercise based on hand-collected family firm history data, whereas the family surnames of the founders and their descendants or heirs as previously identified in the company's proxy statements were matched with the surname of the individual who is reported to be the beneficial owner of the shares transacted. Notably, U.S. listed firms are legally required to disclose the nature of any family relationship between any director or officer in the same firm in their annual proxy statements[5]. Therefore, we were able to identify not only the company's founders but also to include actively involved family members in cases where family affiliation may not have been obvious (e.g. due to marriage or name changes of family insiders). We also manually reviewed the names of insiders with double

[5] The code of federal regulations (17 CFR § 229.401) requires registered firms to state the nature of any family relationship, either by blood, marriage or adoption, not more remote than the first cousin, of directors or officers.

names or unusual foreign surnames which may be spelled differently in the SEC insider trading database. By applying this additional step, we sought to ensure that insider trades were not incorrectly classified as (non)family trades due to name ambiguities in the SEC database and firm annual reports.

3.3.3 Moderator variable

With our definition of an insider, we followed the definition provided by the U.S. Securities and Exchange Commission (Section 16(a) of the SEC Act of 1934). The SEC requires all directors, officers or shareholders with an ownership stake of at least 10% to disclose their insider trading activities. Correspondingly, we defined the moderator variable "non-corporate insider" as 1 when the insider trade was reported by a 10% shareholder who was neither a director nor an officer at the time the transaction was recorded. The variable was set to 0 otherwise[6].

3.3.4 Control variables

We included a set of control variables on insider level, trade level and firm level, which have been previously used in insider trading literature. To avoid a look-ahead bias for estimating abnormal stock returns, relevant trade-level control variables were lagged by one day prior to the day the transaction was executed. To mitigate the same issue for our firm-level control variables, we used quarterly firm financial information reported at the end of the quarter prior to the quarter the transaction was executed, except for firm profitability where we used firm financial information reported at the end of the year prior to the year the transaction was executed. Insider-level control variables were not lagged as these variables are time-invariant.

[6] As mentioned above, we conducted an extensive name-matching exercise to match the surnames of the founding family and its descendants and relatives with the surnames reported in the SEC insider trading database. However, for family non-corporate insiders who own at least 10% of firm ownership, this approach may not be entirely feasible because insider trades by non-corporate insiders can be reported by individuals but also by institutions (e.g. a family trust). Therefore, we manually analyzed the insider trades reported by all institutional investors and cross-checked the ownership structure of these institutional investors with information as disclosed in the form "Schedule 13D" which has to be filed by investors who own more than 5% of any publicly listed company in the U.S.

To control for insider-level characteristics, we included three insider function dummies (i.e. CEO, CFO, Chairman) to control for the effects of superior and advantageous access to material, non-public information as well as to account for the level of regulatory scrutiny of insiders in pivotal corporate roles (Hillier et al., 2015; Knewtson & Nofsinger, 2014; Wang et al., 2012).

To control for trade-level characteristics, we included uncertainty, proxied by stock volatility, which was computed as the standard deviation of the daily stock returns over 250 trading days one day prior to the insider transaction since market uncertainty may result in more opportunistic insider trading behavior (Reeb et al., 2014; Coff & Lee, 2003). We included momentum, proxied by past stock returns and computed as the cumulative stock returns over 250 trading days one day prior to the insider transaction because insiders are shown to be contrarian investors (Gider & Westerheide, 2016; Jenter, 2005; Seyhun, 1986). We also accounted for the trade size computed as the cumulative transaction size on a given transaction day of an insider in a firm since the size of a transaction may be related to the intensity of regulatory and public scrutiny (Kallunki et al., 2016).

To control for firm-level characteristics in model 1, we included firm size computed as the natural logarithm of the total firm employees at the end of the quarter prior to the quarter of the transaction because insider trading profitability can depend on the size of the firm (Lakonishok & Lee, 2001). We also included firm profitability computed as the return on equity of the firm at the beginning of the year of the insider transaction (Gider & Westerheide, 2016; Fidrmuc et al., 2006) and firm valuation computed as the price-to-book value of the firm one quarter prior to the quarter of the transaction (Hillier et al., 2015).

Finally, we included year fixed effects in both models as well as industry fixed effects in model 1. Since insiders can transact multiple times within the same firm in our sample, we controlled for clustering of standard errors on the firm-level. To control for potential outlier effects, we winsorized all continuous variables at the 1st and 99th percentiles of their distributions. Please refer to Appendix 2 for variable definitions.

4 RESULTS

4.1 Descriptive statistics

Table 1 presents the summary statistics of insider purchases (Panel A) and insider sales (Panel B). The average insider in our sample purchased shares 3.0 times and sold firm shares 9.4 times over the sample period of 11 years which is similar to other studies on insider trading of U.S. listed firms (Hillier et al., 2015). Panel A in Table 1 shows that of the 3,871 insider purchases included in our sample, 541 purchases (14% of all purchases) were made by a total of 123 family insiders. At the same time, 1,189 nonfamily insiders reported 3,330 purchases (86% of all purchases). With 4.4 purchases on average, family insiders reported more transactions as compared to the average of 2.8 transactions reported by nonfamily insiders. Regarding the size of insider purchases, family insiders purchased 186,058 (10,000) shares on average (median), whereas nonfamily insiders purchased 223,697 (3,000) shares on average (median). Thus, the average number of shares purchased is lower for family insiders, compared to nonfamily insiders. However, the average and median transaction value of an insider purchase are higher for family insiders, compared to nonfamily insiders.

With respect to insider sales, Panel B in Table 1 shows that there is a total of 3,541 insiders who reported 33,141 insider sales. In our sample, there are 348 family insiders who account for 11,266 insider sales, which equals 34% of all insider sales. At the same time, 3,193 nonfamily insiders account for 21,875 insider sales (66% of all insider sales). Thereby, on average, family insiders sold shares 32.4 times, compared to 6.9 times for nonfamily insiders. Regarding transaction size, family insiders sold on average (median) 179,807 (25,000) shares, compared to nonfamily insiders who sold on average (median) 39,337 (8,929) shares. Thus, the average and median number of shares sold is higher for family insiders, compared to nonfamily insiders.

[insert Table 1 about here]

Table 2 shows the summary statistics of insider trading activity of insider purchases (Panel A) and insider sales (Panel B) split by an insider's family member status and his involvement in the family firm management. Panel A of Table 2 reports that 91.7% of all family insider

purchases were executed by family corporate insiders. This compares to 79.4% of all non-family insider purchases which were transacted by nonfamily corporate insiders. Interestingly, 73.0% of all family corporate insider purchases were reported by family corporate insiders who held both a director and officer position at the time of the transaction. This compares to a share of 6.4% of all nonfamily corporate insiders with a dual executive and director position. Furthermore, our findings empirically corroborate studies that find that around 10% of insider purchases in U.S. listed firms are executed by CEOs (Hillier et al., 2015). Regarding transaction size, family corporate insiders on average (median) purchased 122,776 (10,000) shares, compared to an average (median) purchase size of 10,021 (2,000) for nonfamily corporate insiders. In contrast, the average number of shares purchased is lower for family non-corporate insiders, compared to nonfamily non-corporate insiders.

Panel B in Table 2 reports that family corporate insiders account for 82.9% of all family insider sales in our sample, as compared to the group of nonfamily insiders, where 97.9% of all insider sales were reported by nonfamily corporate insiders. Panel B also reports that family corporate insiders, with an average (median) transaction size of 189,459 (20,000) shares, sold more shares, compared to nonfamily corporate insiders who sold 34,382 (8,724) shares per transaction. In contrast, family non-corporate insiders reported a lower average number of shares sold, compared to nonfamily non-corporate insiders.

[insert Table 2 about here]

4.2 Univariate analysis

Table 3 reports the univariate analysis of insider trading and family firm affiliation of the insiders for insider purchases (Panel A) and sales (Panel B), respectively. We used T-tests to examine whether the differences in means are significantly different from zero. Table 3 generally corroborates the hypotheses that family insiders generate higher abnormal returns for insider purchases but lower abnormal returns for insider sales, compared to nonfamily insiders. Consistent with existing insider trading literature, we find that the abnormal returns for insider sales are lower in absolute terms than the abnormal returns for insider purchases (Kallunki et al., 2016; Hillier et al., 2015; Lakonishok & Lee, 2001).

Panel A in Table 3 reports that the mean six-months abnormal return for insider purchases is significantly higher for family insiders, compared to nonfamily insiders. In particular, the mean abnormal return for family insiders is 20.5%, whereas the mean abnormal return for nonfamily insiders is 7.4%, with the difference in means being statistically significant[7]. Furthermore, Panel A shows that family corporate insiders on average also report significantly higher abnormal returns for their insider purchases (22.3%), compared to mean abnormal returns of nonfamily corporate insiders (7.9%). In contrast, family non-corporate insiders do not generate higher abnormal returns that are statistically significantly different from those of nonfamily non-corporate insiders.

Panel B in Table 3 shows that the mean six-months abnormal return for insider sales is significantly lower (less negative) for family insiders, compared to nonfamily insiders[8]. Family insiders report a mean abnormal return for insider sales of 0.4%, whereas the mean abnormal return for insider sales of nonfamily insiders is -1.8%, with the difference in means being statistically significant. Thus, in contrast to nonfamily insiders, family insiders earn lower abnormal returns from selling their shares because they report a positive abnormal return after the insider sale. Panel B also reports that the mean abnormal return for insider sales of family corporate insiders is significantly lower (less negative) compared to the mean abnormal return of nonfamily corporate insiders. Finally, Panel B shows that these findings are reversed for non-corporate insiders. In particular, the mean abnormal return for insider sales of family non-corporate insiders is -4.6%, whereas the mean abnormal return for insider sales of nonfamily non-corporate insiders is 10.5%, the difference being statistically significant. These results overall corroborate our hypothesis that family corporate insiders do not engage in informed insider sales whereas family non-corporate insiders may indeed exploit information asymmetries when selling shares.

[7] Hillier et al. (2015) report that purchases of insiders in U.S. listed firms are associated with abnormal returns of 6.0% over a six-month investment horizon which is comparable to the mean abnormal returns for purchases of nonfamily insiders in our sample but lower than for purchases of family insiders.

[8] Insiders generate abnormal returns from selling a firm share when the stock underperforms the benchmark subsequent to the sale transaction. Thereby, a negative abnormal return implies that the stock underperforms the benchmark, which is equivalent to a profit for the insider sale from the perspective of the insider because the share was sold before a subsequent price decrease. Equivalently, a positive abnormal return for an insider sale implies that the insider generated a loss because the share price increased more than expected based on capital market models after the firm stock was sold.

Regarding our other variables, Panel A in Table 3 shows that family insiders and nonfamily insiders purchase shares at comparable levels of market uncertainty. While insiders generally have more profitable opportunities to trade in uncertain and volatile market situations (Reeb et al., 2014), our results do not show that family insiders statistically differ from nonfamily insiders in exploiting such situations when purchasing shares. In contrast, Panel B in Table 3 show that the level of market uncertainty is significantly lower for family insiders when they sell shares, compared to nonfamily insiders, which indicates that family insiders sell shares when markets are less volatile. Lastly, our findings in Table 3 are in line with previous work showing that insiders are contrarian investors (Kallunki et al., 2016; Hillier et al., 2015; Lakonishok & Lee, 2001). Literature suggests that insiders purchase firm shares after stock prices have declined and sell firm shares after stock prices have increased (Seyhun, 1986). Our results show that family insiders purchased shares after an average price decline of 23.3% over the previous year, whereas nonfamily insiders purchased shares after an average price decline of 4.1% over the previous year. Family insiders thus purchased their shares after significantly higher price declines, compared to nonfamily insiders. In contrast, family insiders sold their shares after a significantly lower prior price increase (15.4% increase over the previous year), compared to nonfamily insiders (26.6% increase over the previous year).

[insert Table 3 about here]

4.3 Multivariate analysis

Table 4 presents the multivariate regression results for insider purchases (Panel A) and insider sales (Panel B) estimating the impact of the family member status in family firms on the six-months abnormal return subsequent an insider trade. We deploy two types of regression models. Model 1 (reported in columns 1 and 3) includes controls for insider-level, trade-level as well firm-level determinants, while holding industry and year effects fixed. Model 2 (reported in columns 2 and 4) controls for unobserved firm-level heterogeneity by including firm fixed effects to address concerns that our results may be driven by unobserved firm characteristics (Jagolinzer et al., 2011).

Regarding insider purchases, the models present direct empirical evidence that abnormal returns of insider purchases made by family insiders are higher compared to nonfamily insiders. Model 1 in column 1 of Panel A shows that family insiders earn 4.0% more over a 6-month time horizon, compared to nonfamily insiders, however this effect is not statistically significant. When including firm fixed effects (column 2 of Panel A), model 2 shows that the abnormal returns of purchases for family insider are 7.2% higher, compared to nonfamily insider, being statistically significant. However, we do not find that the profitability of insider purchases significantly differs between family corporate insiders and family non-corporate insiders.

Regarding insider sales, Panel B of Table 4 predicts the abnormal returns of insider trades in family firms over a six-month horizon after an insider sale. The results show that family insiders display significantly lower (i.e. less negative) abnormal returns for their sale transactions in comparison to nonfamily insiders. Columns 3 (model 1) and 4 (model 2) provide evidence that the abnormal returns of family insiders are 3.5% and 2.4% lower (less negative) compared to nonfamily insiders. The moderating effect of non-corporate insider status on the profitability of family insider sales indicates that family non-corporate insiders exhibit significantly higher (i.e. more negative) trading profitability compared to family corporate insiders. Family non-corporate insiders, who may be under less public and firm-internal scrutiny compared to family corporate insiders, appear to be better able to benefit from a potential information advantage. The results in Panel B thus lend support to the notion that family non-corporate insiders may benefit from informal information exchanges with family corporate insiders, which they exploit when selling firm shares.

With respect to the explanatory power of our models, the adjusted R-squared of the models in Table 4 are generally higher for insider purchases (Panel A) compared to insider sales (Panel B) which is in line with prior studies (Dai et al., 2016). In addition, the explanatory power of our models is higher when including firm fixed effects thereby excluding observable firm-level variables which is also consistent with prior research (Hillier et al., 2015).

[insert Table 4 about here]

5 ROBUSTNESS TESTS

5.1 Long-term abnormal stock returns

Following existing research on insider trading (Hillier et al., 2015; Lakonishok & Lee, 2001), in our core analysis we focused on abnormal stock returns of insiders in family firms with a buy-and-hold horizon of six months. However, because family insiders tend to invest into their firms for the long-term (Villalonga & Amit, 2006; Anderson & Reeb, 2003), family insiders may also apply a longer-term horizon with respect to insider trading.

Because long-term abnormal return estimates are generally more prone to model misspecifications compared to short-term estimates (Fama, 1998; Barber & Lyon, 1997; Kothari & Warner, 1997), we estimated the long-term abnormal stock returns using use three different benchmarks for the analysis of long-term abnormal returns of insider trading in family firms. As a *first* benchmark (reference portfolio approach), we used the S&P 1500 index as a portfolio benchmark, thereby following Barber and Lyon (1997). As a *second* benchmark, (reference portfolio approach), we calculated the abnormal returns using ten size-based reference portfolios that are reconstituted once per year. Following Fidrmuc et al. (2006) and Lakonishok and Lee (2001), we created size deciles on the basis of equity market values of the S&P 1500 sample firms. Then, portfolio returns were calculated for each of the ten size portfolios, reconstituted annually, as the average of stock returns across all firms in a particular size portfolio. As a *third* benchmark (control firm return approach), we calculated the abnormal returns using matched firms based on a comparable firm characteristic (Dutta & Jog, 2009). Following Barber and Lyon (1997), we matched all family firms to a control firm within the S&P 1500 sample firms based on the most similar equity market value. The market values of the family firm and the control firm were re-matched annually.

Table 5 presents the regression results for the estimation of the one-year abnormal returns in family firms for insider purchases (insider sales) in Panel A (Panel B). Panel A of Table 5 confirms the main results we found when applying a six-month investment horizon (see Table 4). Over a 1-year investment horizon, family insiders earn significantly higher abnormal returns on their purchases, the outperformance in comparison to nonfamily insiders ranging between 11.5% to 13.0%, depending on the benchmark applied. Furthermore, and consistent with the six-month investment horizon, the moderating effect of non-corporate insiders on

the profitability of family insider trades is negative, however not significant. Regarding insider sales reported in Panel B of Table 5, family insiders exhibit significantly lower (less negative) abnormal returns between 3.4% and 4.9% from selling shares over a 1-year time horizon compared to nonfamily insiders. Again, this result is consistent with what we found in the main analysis reported in Table 4. The moderating effects of non-corporate insiders on abnormal returns of family insiders overall remain negative and mostly significant as well, suggesting that family insiders who are not involved in the active management are more prone to exploit information advantages compared to family corporate insiders.

[insert Table 5 about here]

5.2 Institutional background of insider trading

While literature on insider trading has often focussed on corporate insider trading (Gider & Westerheide et al., 2016; Kallunki et al., 2016; Hillier et al., 2015), we expanded such research by investigating the relevance of non-corporate insiders. However, as these two groups differ with respect to their managerial involvement in the firm as well as their access to privileged information, they may be bound by different insider trading restrictions that could potentially distort our results.

Indeed, while some insider trading regulations, such as Section 16(a) of the Securities Exchange Act of 1934, impose the same requirements on both corporate insiders and non-corporate insiders, others, such as ITSEFA, focus more on corporate insiders and even hold firms liable for illegal insider trading of their employees[9]. To reduce their legal risks, many firms have thus designed mechanisms to discourage and restrict corporate insiders from exploiting information advantages (Lee et al., 2014). A common mechanism to curb illegal insider trading is to establish blackout periods during which insiders are restricted from transacting their own stock without pre-clearance (Lee et al., 2014; Jagolinzer et al., 2011). The implementation of blackout periods is however voluntary and the details and extent of such restrictions vary between firms (Dai et al., 2014; Jagolinzer et al., 2011). Yet, it is likely that

[9] ITSEFA was passed in 1988 and aimed to alleviate illegal insider trading by increasing the maximum penalty to $1 million and 10 years in prison. In addition, the regulation specifically states that top management can be held liable for illegal insider trading by employees.

firms that implement such policies do so to restrict insider trading of corporate insiders rather than that of non-corporate insiders. First, existing regulations, such as ITSEFA, impose legal penalties on firms for illegal insider trading by corporate insiders rather than by non-corporate insiders which should incentivize firms to closely regulate corporate insider trading. Second, because blackout periods are meant to limit an insider's desire to exploit information advantages, imposing blackout periods on corporate insiders who have immediate access to material, non-public information seems more feasible. It is thus possible that corporate insiders generally face more strict trading restrictions and may not be able to trade during the same time widows as non-corporate insiders due to blackout periods.

To test whether differences in trading windows between corporate insiders and non-corporate insiders affect our main results, we tested two additional models. First, using our baseline model with firm fixed effects, we included month fixed effects instead of year fixed effects. Second, we added both month as well as year fixed effects to the model[10].

Table 6 shows the results for insider purchases (Panel A) and insider sales (Panel B), respectively. Regarding insider purchases, our results in Panel A show that the main findings remain economically and statistically stable when including month fixed effects (column 1) as well as month and year fixed effects (column 2). Regarding insider sales, Panel B reports that the results are also consistent with our main findings when we include month fixed effects (column 3) and also when including month and year fixed effects (column 4). Thus, potential differences in permitted trading windows that could be a result of blackout periods do not seem to affect our findings.

[insert Table 6 about here]

5.3 January effect

To test the assumption that family corporate insiders and family non-corporate insiders may share information in informal settings, we analyse the abnormal returns of insider transactions after family gatherings which typically take place during Christmas and New Year. We

[10] For the distribution of insider trades by month please see appendix 4.

therefore split the sample into insider transactions which were made in January and transactions which were made between the months of February and December.

Table 7 reports the regression results for estimating abnormal returns of insider trades for the sample split. For January insider purchases, our results in column 1 of Panel A show that family insiders generate higher abnormal returns compared to nonfamily insiders, although the difference is not statistically significant. For insider purchases transacted between February and December, column 2 of Panel A shows that family insiders report significantly higher abnormal returns compared to nonfamily insiders. Thus, we do not find support that family insiders generate statistically higher abnormal returns, compared to nonfamily insiders for insider purchases made in January. Consistent with our main results, we do not find that management involvement of insiders significantly affects the profitability of insider purchases in family firms for either of the subsamples.

Regarding insider sales in Panel B, column 3 reports that family insiders generate lower (less negative) abnormal returns when selling shares in January compared to nonfamily insiders, although the difference is not statistically significant. However, family non-corporate insiders earn significantly higher (more negative) abnormal returns compared to family corporate insiders when selling shares in January. For insider sales transacted between February to December (column 4), we find that family insiders generate significantly lower abnormal returns compared to nonfamily insiders. Family non-corporate insiders also earn significantly higher (more negative) abnormal returns compared to family corporate insiders for insider sales reported between February to December. Thus, while we do not find evidence that family insiders generate significantly higher abnormal returns compared nonfamily insiders when selling shares in January, our results show that family non-corporate insider generate significantly higher abnormal returns compared to family corporate insiders, the difference being statistically and economically highly significant. This suggests that information leakages to family non-corporate insiders may be particularly pronounced for insider sales in made in January.

[insert Table 7 about here]

5.4 Robustness of the dependent variable

We tested the robustness of the dependent variable using three different definitions of the return benchmark to calculate the abnormal returns. In our baseline regressions, we defined the BHAR as the delta between the stock return and the expected return based on the CAPM of the respective stock following an insider transaction. In Table 8, we additionally calculated the BHAR using the Fama-French 3-factor model (Fama & French, 1992) as well as the Carhart 4-factor model (Carhart, 1997). Table 8 shows that the results are overall economically and statistically stable across both alternative benchmarks for calculating the abnormal returns of insider trades in family firms.

[insert Table 8 about here]

6 CONCLUSION

We examined whether insiders who are personally related to the founding family in family firms are more prone to exploit their information advantages compared to insiders who are unrelated to the founding family. Our study has three main findings. *First*, family insiders earn significantly higher abnormal returns when purchasing firm shares compared to non-family insiders. *Second*, family insiders earn significantly lower abnormal returns when purchasing firm shares compared to nonfamily insiders. Thereby, family insiders seem to be more inclined to exploit information asymmetries when purchasing firm shares as compared insiders without such a family relationship. Yet, being personally related to the founding family also implies that family insiders avoid to opportunistically time their insider transactions when selling firm shares, presumably because family insiders are more concerned about the litigation and reputational costs arising from insider trading which is asymmetrically higher for insider sales. *Third*, our findings also show that the abnormal returns for insider sales of family non-corporate insiders are significantly higher compared to family insiders actively engaged in the top management of family firms. Family non-corporate insiders may take advantage of their personal relationship with family corporate insiders and the controlling family to exploit information advantages while not being exposed to the same level of regulatory scrutiny as family corporate insiders. For insider purchases we do not find significant differences between insider purchases conducted by family corporate and family non-corporate insiders. We conjecture that the reduced regulatory scrutiny imposed on family non-corporate insiders in comparison to family corporate insiders is of more limited value in the case of insider purchases, given that the potential consequences are less detrimental for insider purchases than for sales.

With these findings we make two contributions. First, we contribute to literature on insider trading heterogeneity (Kallunki et al., 2018; Kallunki et al., 2016; Hillier et al., 2015) with a more profound understanding of how personal ties to the firm affect an insider's disposition to exploit insider information advantages. Second, we extend research on insider activities and information leakages in family firms (Sun and Yin, 2017; Anderson et al., 2012) by examining different types of insiders within family firms. Thereby, we show that the profitability of insider trading in family firms depends on whether the insider is part of the founding family and whether the insider is actively involved in the firm's management.

References

Agrawal, A. & Cooper, T. (2015). Insider trading before accounting scandals, *Journal of Corporate Finance*, Vol. 34, pp. 169–190.

Agrawal, A. & Nasser, T. (2012). Insider trading in takeover targets, *Journal of Corporate Finance*, Vol. 18, pp. 598–625.

Amore, M.D., Miller, D., Le Breton-Miller, I. & Corbetta, G. (2017). For love and money: Marital leadership in family firms, *Journal of Corporate Finance*, Vol. 46, pp.461–476.

Anderson, R.C., Duru, A. &. Reeb, D.M. (2009). Founders, Heirs, and Corporate Opacity, *Journal of Financial Economics*, Vol. 92, pp. 205–222.

Anderson, R.C. & Reeb, D.M. (2003). Founding-Family ownership and Firm Performance: Evidence from the S&P 500, *The Journal of Finance*, Vol. 63, pp. 1301–1328.

Anderson, R.C. & Reeb, D.M. (2004). Board composition: balancing family influence in S&P 500 firms, *Administrative Science Quarterly*, Vol. 49(2), pp. 209–237.

Anderson, R.C., Reeb, D.M. & Zhao, W. (2012). Family-Controlled Firms and Informed Trading: Evidence from Short Sales, *The Journal of Finance*, Vol. 67(1), pp. 351–385.

Barber, B.M. & Lyon, J.D. (1997). Detecting long-run abnormal stock returns: The empirical power and specification of test-statistics, *Journal of Financial Economics*, Vol. 43, pp. 341–372.

Bettis, C., Coles, J. & Lemmon, M. (2000). Corporate policies restricting trades by insiders, *Journal of Financial Economics*, Vol. 57(2), pp. 191–220.

Cao, Y., Dhaliwal, D., Li, Z. & Yang, Y.G. (2015). Are All Independent Directors Equally Informed? Evidence Based on Their Trading Returns and Social Networks, *Management Science*, Vol. 61(4), pp. 795–813.

Carhart, M. (1997). On Persistence in Mutual Fund Performance, *The Journal of Finance*, Vol. 52, pp. 57–82.

Chen, S., Chen, X. & Cheng, Q. (2008). Do family firms provide more or less voluntary disclosure? *Journal of Accounting Research*, Vol. 46(3), pp. 499–536.

Cheng, Q. & Lo, K. (2006). Insider trading and voluntary disclosures, *Journal of Accounting Research*, Vol. 44, pp. 815–848.

Coff, R.W. & Lee, P.M. (2003). Insider trading as a vehicle to appropriate rent from R&D, *Strategic Management Journal*, Vol. 24, pp. 183–190.

Cruz, C., Gomez-Mejia, L.R. & Becerra, M. (2010). Perceptions of benevolence and the design of agency contracts: CEO-TMT relationships in family firms, *The Academy of Management Journal*, Vol. 53(1), pp. 69–89.

Cucculelli, M. & Micucci, G. (2008). Family succession and firm performance: Evidence from Italian family firms, *Journal of Corporate Finance*, Vol. 14, pp. 17–31.

Dai, L., Fu, R., Kang, J.K. & Lee, I. (2016). Corporate governance and the profitability of insider trading, *Journal of Corporate Finance*, Vol. 40, pp. 235–253.

Dutta, J. & Jog, V. (2009). The long-term performance of acquiring firms: A re-examination of an anomaly, *Journal of Banking & Finance*, Vol. 33(8), pp. 1400–1412.

Fama, E.F. (1998). Market efficiency, long-term returns, and behavioral finance, *Journal of Financial Economics* Vol. 49, pp. 283–306.

Fama, E.F. & French, K. (1992). The cross-section of expected stock returns, *The Journal of Finance*, Vol. 47, pp. 427–465.

Fidrmuc, J.P., Goergen, M. & Renneboog, L. (2006). Insider trading, news releases, and ownership concentration, *The Journal of Finance*, Vol. 61(6), pp. 2931–2973.

Franco, F., Ittner, C.D. & Urcan, O. (2017). Determinants and trading performance of equity deferrals by corporate outside directors, *Management Science*, Vol. 63(1), pp. 114–138.

Garfinkel, J. (1997). New evidence on the effects of federal regulation on insider trading: The Insider Trading and Securities Fraud Enforcement Act (ITSFEA), *Journal of Corporate Finance*, Vol. 3, pp. 89–111.

Gider, J. & Westerheide, C. (2016). Relative idiosyncratic volatility and the timing of corporate insider trading, *Journal of Corporate Finance*, Vol. 39, pp. 312–334.

Gomez-Mejia, L., Haynes, K., Nunez, M., Jacobson, K. & Moyano, J. (2007). Socio-emotional wealth and business risk in family-controlled firms: evidence from Spanish olive oil mills, *Administrative Science Quarterly*, Vol. 52, pp. 106–137.

Gomez-Mejia, L.R., Nunez-Nickel, M., & Gutierrez, I. (2001). The role of family ties in agency contracts, *The Academy of Management Journal*, Vol. 44(1), pp. 81–95.

Hillier, D., Korczak, A. & Korczak, P. (2015). The impact of personal attributes on corporate insider trading, *Journal of Corporate Finance*, Vol. 30, pp. 150–167.

Jagolinzer, A.D., Larcker, D.F. & Taylor, D.J. (2011). Corporate governance and the information content of insider trades, *Journal of Accounting Research*, Vol. 49, pp. 1249–1274.

Jenter, D. (2005). Market timing and managerial portfolio decisions, *The Journal of Finance*, Vol. 60, pp. 1903–1949.

Kahle, K. (2000). Insider trading and the long-run performance of new security issues, *Journal of Corporate Finance*, Vol. 6, pp. 25–53.

Kallunki, J., Kallunki, J.P., Nilsson, H. & Puhakka, M. (2018). Do an insider's wealth and income matter in the decision to engage in insider trading? *Journal of Financial Economics*, Vol. 130(1), pp.135–165.

Kallunki, J.P., Mikkonen, J., Nilsson, H. & Setterberg, H. (2016). Tax noncompliance and insider trading, *Journal of Corporate Finance*, Vol. 36, pp. 157–173.

Kothari, S.P. & Warner, J.B. (1997). Measuring long-horizon security price performance, *Journal of Financial Economics* Vol. 43, pp. 301–339.

Knewtson, H.S. & Nofsinger, J.R. (2014). Why are CFO insider trades more informative? *Managerial Finance*, Vol. 40(2), pp. 157–175.

Lakonishok, J. & Lee, I. (2001). Are insider trades informative? *Review of Financial Studies*, Vol. 14, pp. 79–111.

Lee, I. (1997). Do firms knowingly sell overvalued equity? *The Journal of Finance*, Vol. 52, pp. 1439–1466.

Lee, I., Lemmon, M., Li, Y. & Sequeira, J. (2014). Do voluntary corporate restrictions on insider trading eliminate informed insider trading? *Journal of Corporate Finance*, Vol. 29, pp. 158–178.

Miller, D., Le Breton-Miller, I., Lester, R.H. & Cannella, A.A. Jr (2007). Are family firms really superior performers? *Journal of Corporate Finance*, Vol. 13, pp.829–858.

Ravina, E. & Sapienza, P. (2010). What do independent directors know? Evidence from their trading, *Review of Financial Studies*, Vol. 23, pp. 962–1003.

Reeb, D.M., Zhang, Y. & Zhao, W. (2014). Insider Trading in Supervised Industries, *The Journal of Law & Economics*, Vol. 57, pp. 529–559.

Seyhun, N. (1986). Insiders' profits, costs of trading, and market efficiency, *Journal of Financial Economics*, Vol. 16, pp. 189–212.

Seyhun, N. (1992). The effectiveness of the insider-trading sanctions, *Journal of Law and Economics*, Vol. 35, pp. 149–182.

Sun, H. & Yin, S. (2017). Information leakage in family firms: Evidence from short around insider sales, *Journal of Corporate Finance*, Vol. 47, pp. 72–87.

Villalonga, B. & Amit, R. (2006). How do family ownership, control, and management affect firm value? *Journal of Financial Economics*, Vol. 80, pp. 385–417.

Villalonga, B., Amit, R., Trujillo, M.A., & Guzman, A. (2015). Governance of Family Firms, *Annual Review of Financial Economics*, Vol. 7, pp. 635–654.

Wang, W., Shin, Y. & Francis, B.B. (2012). Are CFOs' trades more informative than CEOs' trades? *The Journal of Financial and Quantitative Analysis*, Vol. 47, pp. 743–762.

Zellweger, T.M. (2017). *Managing the Family Business: Theory and Practice.* Cheltenham, UK: Edward Elgar.

Zellweger, T.M., Kellermanns, F.W., Chrisman, J.J. & Chua, J.H. (2012). Family control and family firm valuation by family CEOs: The importance of intentions for transgenerational control, *Organization Science*, Vol. 23(3), pp. 851–868.

Table 1: Summary statistics of insider trading activity by family member status

This table reports the summary statistics of insider purchases (Panel A) and sales (Panel B) made by family and nonfamily insiders. The sample consists of all insider trades reported by all directors, officers and shareholders with an ownership stake of at least 10% in S&P 1500 family firms as of 2005 for the transaction period from 2005 until 2015. The variable "family insider" relates to insiders who are part of the founding family by either blood, marriage or adoption at the time of the transaction and is equal to a "nonfamily insider", otherwise. A family insider is considered being part of the founding family if his surname is equal to 1) the surname of the founding family, or equal to 2) the surname of the descendants and/or heirs of the founding family.

	No. of insiders		No. of insider trades		No. of shares transacted			Value (USD) of shares transacted		
	#	%	#	%	Mean	StDev	Median	Mean	StDev	Median
					Panel A: Insider purchases					
Family insider	123	9.4%	541	14.0%	4.4	186,058	1,520,535	10,000	2,970,040	17,400,000	105,650
Nonfamily insider	1,189	90.6%	3,330	86.0%	2.8	223,697	5,944,523	3,000	2,670,105	38,500,000	50,460
	1,312	*100.0%*	3,871	*100.0%*	3.0						
					Panel B: Insider sales					
Family insider	348	9.8%	11,266	34.0%	32.4	179,807	594,887	25,000	4,705,664	17,000,000	537,268
Nonfamily insider	3,193	90.2%	21,875	66.0%	6.9	39,337	322,102	8,929	1,276,886	10,100,000	290,183
	3,541	*100.0%*	33,141	*100.0%*	9.4						

Table 2: Summary statistics of insider trading activity by insider function

This table reports summary statistics on insiders' trading activity depending on their function in the family firm at the time the insider transaction was reported to the SEC. Panel A (Panel B) refers to insider purchases (sales) split by the function of the insider. The function typology is mutually exclusive. Hence, the type "Director" ("Officer") includes insiders who are only directors (officers) and thus excludes insiders who are simultaneously directors and officers in the same firm at the time of the transaction. The function "Director & Officer" includes insiders who are both directors and officers at the time of the transaction. The function "Non-corporate insider" refers to insiders who own at least 10% of the firm but are neither directors nor officers. The number of insiders does not necessarily have to reconcile with the number of insiders in Table 1 since insiders may change their functions over the course of the observation period.

	Family insider						Nonfamily insider					
	No. of insiders	No. of insider trades		Avg. No. of shares transacted			No. of insiders	No. of insider trades		Avg. No. of shares transacted		
		#	%	Mean	StDev	Median		#	%	Mean	StDev	Median
						Panel A: Insider purchases						
Corporate insider	*104*	*496*	*91.7%*	*122,776*	*570,651*	*10,000*	*1,152*	*2,644*	*79.4%*	*10,021*	*65,835*	*2,000*
Director (only)	37	99	18.3%	132,297	597,323	10,000	669	1,645	49.4%	11,353	78,292	2,000
Officer (only)	5	2	0.4%	12,950	17,041	12,950	384	786	23.6%	5,035	17,354	2,000
Director & Officer	62	395	73.0%	120,946	565,937	10,000	99	213	6.4%	18,132	72,210	5,000
Chairman (only)	17	51		112,709	181,238	60,000	-	-		-	-	-
CEO (only)	13	216		30,080	62,701	5,000	64	138		11,057	17,358	5,000
Chairman & CEO	21	111		310,579	1,034,917	15,238	14	41		15,870	30,826	5,000
Non-corporate insider	*23*	*45*	*8.3%*	*883,567*	*4,916,165*	*80,000*	*86*	*686*	*20.6%*	*1,047,253*	*13,100,000*	*30,000*
Sum	127	541	100.0%				1,238	3,330	100.0%			
						Panel B: Insider sales						
Corporate insider	*343*	*9,334*	*82.9%*	*189,459*	*606,269*	*20,000*	*3,574*	*21,417*	*97.9%*	*34,382*	*278,285*	*8,724*
Director (only)	138	4,517	40.1%	256,770	773,853	19,200	1,009	4,916	22.5%	29,798	269,730	6,369
Officer (only)	32	402	3.6%	17,483	48,227	6,750	2,282	13,941	63.7%	23,904	73,035	8,148
Director (only)	173	4,415	39.2%	136,251	392,576	25,000	283	2,560	11.7%	100,247	688,722	20,000
Chairman (only)	52	1,275		185,696	596,485	25,000	18	130		127,187	215,635	33,590
CEO (only)	53	1,072		233,230	392,997	25,807	132	1,142		113,249	927,946	16,867
Chairman & CEO	48	1,281		43,061	113,035	20,000	45	351		66,504	220,881	25,000
Non-corporate insider	*98*	*1,932*	*17.1%*	*133,180*	*534,202*	*50,103*	*79*	*458*	*2.1%*	*271,036*	*1,132,176*	*27,759*
Sum	441	11,266	100.0%				3,653	21,875	100.0%			

Table 3: Univariate analysis of insider trading and family member status

This table shows the univariate analysis of insider trading and family affiliation for insiders in family firms. Insider transactions are classified into two sub-groups, i.e. transactions made by insiders who are related to the founding family of the family firm by either blood, marriage or adoption (family insiders) and transactions made by insiders without such family relationship to the founding family (nonfamily insiders). The sample data consists of insider purchases (Panel A) and insider sales (Panel B) transacted between 2005 and 2015. BHAR represent the excess return between a buy-and-hold return of a stock of a family firm and the 1-factor expected returns (CAPM) of the respective stock over the period of 120 trading days. All continuous variables are winsorized at the 1st and 99th percentile. The differences in mean were tested using a t-test. The symbols *, ** and *** indicate two-tail significance at the 5%, 1% and 0.1% levels, respectively.

	Family firm affiliation				
	Family insiders		Nonfamily insiders		Test for differences
	Mean	Median	Mean	Median	Mean
			Panel A: Insider purchases		
BHAR	0.205	0.054	0.074	0.024	-0.1307***
BHAR - Corporate insiders	0.223	0.060	0.079	0.021	-0.1443***
BHAR - Non-corporate insiders	0.004	-0.032	0.057	0.040	0.0535
CEO position	0.604	1.000	0.065	0.000	-0.5392***
CFO position	0.004	0.000	0.073	0.000	0.0696***
Chairman position	0.299	0.000	0.026	0.000	-0.2733***
Uncertainty	0.261	0.152	0.263	0.167	0.0026
Momentum	-0.233	-0.272	-0.041	-0.089	0.1914***
Trade size	81'669	10'000	33'455	3'000	-48'214***
Firm size	8.303	8.189	8.375	8.180	0.0728
Firm valuation	2.358	2.280	2.568	2.040	0.2095
Firm profitability	7.023	9.690	6.734	9.690	-0.2894
N	541		3,330		
			Panel B: Insider sales		
BHAR - All insiders	0.004	0.001	-0.018	-0.027	-0.0228***
BHAR - Corporate insiders	0.015	0.009	-0.021	-0.027	-0.0359***
BHAR - Non-corporate insiders	-0.046	-0.041	0.105	0.051	0.1508***
CEO position	0.213	0.000	0.077	0.000	0.0767***
CFO position	0.004	0.000	0.080	0.000	0.0757***
Chairman position	0.230	0.000	0.023	0.000	-0.2074***
Uncertainty	0.221	0.167	0.289	0.190	0.0681***
Momentum	0.154	0.132	0.266	0.201	0.1122***
Trade size	132'267	25'000	31'122	8'929	-101'144***
Firm size	9.074	9.119	9.020	8.987	-0.0537**
Firm valuation	2.671	2.360	3.054	2.500	0.3833***
Firm profitability	11.229	12.030	14.751	13.610	3.5221***
N	11,266		21,875		

Table 4: Determinants of abnormal stock returns in family firms

This table shows the regression analysis for estimating the buy-and-hold abnormal returns (BHAR) for insider trades in family firms. The dependent variable BHAR represent the excess return between a buy-and-hold return of a stock of a family firm and the 1-factor expected returns (CAPM) of the respective stock over the period of 120 trading days. The sample data consists of all insider transactions by directors, officers or shareholders with an ownership stake of at least 10% reported under the Form 4 to the SEC of S&P 1500 family firms at the beginning of 2005 between 2005 and 2015. The symbols *, ** and *** indicate two-tail significance at the 10%, 5% and 1% levels, respectively. The two bottom rows of the table provide the adjusted R-squared and the sample size for the regressions. All continuous variables are winsorized at the 1st and 99th percentile. The intercept is included in regressions but not reported. The standard errors in parentheses refer to heteroskedasticity-consistent standard errors clustered at the firm-level.

	Panel A: Insider purchases		*Panel B: Insider sales*	
	(1)	(2)	(3)	(4)
Family member	0.0402	0.0720**	0.0348***	0.0241***
	(0.0709)	(0.0363)	(0.0107)	(0.0086)
Non-corporate insider	-0.0117	-0.031	0.111**	0.107**
	(0.0611)	(0.0771)	(0.0533)	(0.0457)
Family member*Non-corporate	-0.0574	-0.0211	-0.174***	-0.101**
	(0.0990)	(0.0925)	(0.0607)	(0.0494)
CEO position	0.0533	0.0135	-0.013	-0.00491
	(0.0599)	(0.0347)	(0.0118)	(0.0084)
CFO position	0.00659	0.000717	-0.0161*	-0.0167**
	(0.0282)	(0.0339)	(0.0087)	(0.0081)
Chairman position	0.0464	0.023	0.00267	-0.0189*
	(0.0712)	(0.0432)	(0.0177)	(0.0107)
Uncertainty	-0.00457	-0.0672	-0.0131	-0.163***
	(0.0279)	(0.0717)	(0.0145)	(0.0555)
Momentum	-0.102*	-0.148**	-0.0326*	-0.0580***
	(0.0585)	(0.0584)	(0.0171)	(0.0159)
Trade size	-1.02 E-08*	-2.62E-08	-2.23E-08	2.23E-09
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Firm size	-0.007		-0.000311	
	(0.0113)		(0.0046)	
Firm valuation	0.00629		-0.00146	
	(0.0073)		(0.0041)	
Firm profitability	-0.00129		0.000392	
	(0.0010)		(0.0008)	
F.E. Year	Yes	Yes	Yes	Yes
F.E. Industry	Yes	No	Yes	No
F.E. Firm	No	Yes	No	Yes
Adjusted R-squared	0.146	0.328	0.028	0.184
N	3,871	3,871	33,141	33,141

Table 5: Determinants of 1-year abnormal stock returns in family firms

This table shows the regression analysis for estimating the 1-year buy-and-hold abnormal returns (BHAR) for insider trades (i.e. officers, directors and/or 10% shareholders) in family firms. 1-year BHARs are calculated in three different ways. The BHAR (1) represents the excess return of the 1-year buy-and-hold return of the respective stock and the 1-year S&P 1500 return. The BHAR (2) represents the excess return of the 1-year buy-and-hold return of the respective stock and a 1-year return of a size-decile matched benchmark portfolio based on market value, reconstituted annually. The BHAR (3) represents the excess return of the 1-year buy-and-hold return of the respective stock and a 1-year buy-and-hold return of a matched firm with the most similar market value, re-matched annually. The sample data consists of all insider transactions reported under Form 4 to the SEC of S&P 1500 family firms between 2005 and 2015. The symbols *, ** and *** indicate two-tail significance at the 10%, 5% and 1% levels, respectively. The two bottom rows of the table provide the adjusted R-squared and the sample size for the regressions. All continuous variables are winsorized at the 1st and 99th percentile. The intercept is included in regressions but not reported. The standard errors in parentheses are heteroscedasticity-consistent and clustered at the firm-level.

	Panel A: Insider purchases			*Panel B: Insider sales*		
	BHAR (1)	BHAR (2)	BHAR (3)	BHAR (1)	BHAR (2)	BHAR (3)
Family member	0.130**	0.115*	0.130*	0.0492***	0.0337**	0.0444*
	(0.0651)	(0.0691)	(0.0782)	(0.0163)	(0.0139)	(0.0235)
Non-corporate insider	-0.056	-0.0359	0.0774	0.162*	0.182**	0.216*
	(0.1110)	(0.1250)	(0.1610)	(0.0860)	(0.0818)	(0.1280)
Family member*Non-corporate	-0.0102	-0.0359	-0.1300	-0.154*	-0.159*	-0.201
	(0.1320)	(0.1420)	(0.1760)	(0.0906)	(0.0866)	(0.1540)
CEO position	0.07	0.0818	0.143***	0.00445	0.00634	-0.0107
	(0.0537)	(0.0503)	(0.0538)	(0.0179)	(0.0179)	(0.0245)
CFO position	-0.0403	-0.0535	-0.0368	-0.0126	-0.0115	-0.00508
	(0.0556)	(0.0585)	(0.0844)	(0.0102)	(0.0103)	(0.0171)
Chairman position	0.0164	0.0029	-0.00437	-0.00286	-0.00274	0.0128
	(0.0737)	(0.0695)	(0.0808)	(0.0242)	(0.0265)	(0.0302)
Uncertainty	-0.245**	-0.236*	-0.291**	-0.299***	-0.287***	-0.276***
	(0.1230)	(0.1220)	(0.1260)	(0.0717)	(0.0662)	(0.0863)
Momentum	-0.278***	-0.217***	-0.259***	-0.0952***	-0.0930***	-0.107***
	(0.0772)	(0.0776)	(0.0921)	(0.0255)	(0.0267)	(0.0365)
Trade size	-1.54e-08	1.87e-08	7.4e-09	-1.7e-08	-1.75e-08	-2.11e-08
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
F.E. Year	Yes	Yes	Yes	Yes	Yes	Yes
F.E. Firm	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.505	0.437	0.494	0.269	0.252	0.208
N	3,871	3,871	3,871	33,141	33,141	33,141

Table 6: Abnormal stock returns and trading windows

This table shows the regression analysis for estimating the buy-and-hold abnormal returns (BHAR) for insider trades in family firms. The dependent variable BHAR represent the excess return between a buy-and-hold return of a stock of a family firm and the 1-factor expected returns (CAPM) of the respective stock over the period of 120 trading days. The sample data consists of all insider transactions by directors, officers or shareholders with an ownership stake of at least 10% reported under the Form 4 to the SEC of S&P 1500 family firms at the beginning of 2005 between 2005 and 2015. The symbols *, ** and *** indicate two-tail significance at the 10%, 5% and 1% levels, respectively. The two bottom rows of the table provide the adjusted R-squared and the sample size for the regressions. All continuous variables are winsorized at the 1st and 99th percentile. The intercept is included in regressions but not reported. The standard errors in parentheses refer to heteroskedasticity-consistent standard errors clustered at the firm-level.

	Panel A: Insider purchases		*Panel B: Insider sales*	
	(1)	(2)	(3)	(4)
Family member	0.0767*	0.0679*	0.0234**	0.0242***
	(0.0441)	(0.0361)	(0.0092)	(0.0087)
Non-corporate insider	-0.0142	-0.0272	0.106**	0.103**
	(0.0826)	(0.0772)	(0.0454)	(0.0446)
Family member*Non-corporate	-0.0222	-0.00602	-0.105**	-0.0985**
	(0.0948)	(0.0913)	(0.0486)	(0.0482)
CEO position	0.000777	0.0166	-0.00304	-0.00444
	(0.0365)	(0.0341)	(0.0087)	(0.0084)
CFO position	-0.00173	-0.00221	-0.0162**	-0.0166**
	(0.0372)	(0.0335)	(0.0080)	(0.0081)
Chairman position	0.0515	0.0324	-0.0215**	-0.0188*
	(0.0427)	(0.0423)	(0.0108)	(0.0107)
Uncertainty	-0.0174	-0.0691	-0.138***	-0.159***
	(0.0758)	(0.0668)	(0.0504)	(0.0532)
Momentum	-0.169***	-0.146**	-0.0649***	-0.0580***
	(0.0554)	(0.0561)	(0.0165)	(0.0161)
Trade size	-4.21E-08	-1.81E-08	1.77E-09	2.41E-09
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
F.E. Month	Yes	Yes	Yes	Yes
F.E. Year	No	Yes	No	Yes
F.E. Firm	Yes	Yes	Yes	Yes
Adjusted R-squared	0.283	0.340	0.178	0.188
N	3,871	3,871	33,141	33,141

Table 7: January effect

This table shows the regression analysis for estimating the buy-and-hold abnormal returns (BHAR) for insider transactions in family firms. The dependent variable BHAR represent the excess return between a buy-and-hold return of a stock of a family firm and the 1-factor expected returns (CAPM) of the respective stock over the period of 120 trading days. The sample is split into two subsamples. First, the columns labeled "January" refer to the subsample which only includes transactions executed by insiders in the month of January. Second, the columns labeled "Other months" refer to the subsample which only includes transactions executed by insiders between the months of February and December. The symbols *, ** and *** indicate two-tail significance at the 10%, 5% and 1% levels, respectively. The two bottom rows of the table provide the adjusted R-squared and the sample size for the regressions. All continuous variables are winsorized at the 1st and 99th percentile. The intercept is included in regressions but not reported. The standard errors in parentheses refer to heteroskedasticity-consistent standard errors clustered at the firm-level.

	Panel A: Insider purchases		*Panel B: Insider sales*	
	January	Other months	January	Other months
	(1)	(2)	(3)	(4)
Family member status	0.041	0.0765*	0.0292	0.0226***
	(0.0642)	(0.0390)	(0.0192)	(0.0084)
Non-corporate insider status	0.0774	-0.032	0.304***	0.114**
	(0.0963)	(0.0781)	(0.0946)	(0.0503)
Family member*Non-corporate	-0.145	-0.018	-0.323***	-0.107**
	(0.1200)	(0.0953)	(0.0945)	(0.0538)
CEO position	0.0211	0.0145	0.00305	-0.00503
	(0.0531)	(0.0362)	(0.0180)	(0.0080)
CFO position	-0.192**	0.00473	0.0155	-0.0168**
	(0.0797)	(0.0343)	(0.0253)	(0.0080)
Chairman position	-0.101*	0.031	-0.0277	-0.0166
	(0.0593)	(0.0475)	(0.0276)	(0.0107)
Uncertainty	0.17	-0.0426	-0.0798	-0.167***
	(0.2330)	(0.0666)	(0.0539)	(0.0556)
Momentum	0.245	-0.166***	-0.0249	-0.0615***
	(0.1810)	(0.0618)	(0.0488)	(0.0154)
Trade size	-0.000000113	-2.34E-08	-1.31E-08	2.19E-09
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
F.E. Year	Yes	Yes	Yes	Yes
F.E. Firm	Yes	Yes	Yes	Yes
Adjusted R-squared	0.901	0.349	0.487	0.181
N	231	3,640	1,877	31,264

Table 8: Robustness of the dependent variable

This table shows the regression analysis estimating the profitability for insider trades in family firms. The dependent variable BHAR represents the excess return between a buy-and-hold return of a stock of a family firm and the 3-factor expected returns (Fama-French) and the 4-factor expected return (Carhart) of the respective stock over the period of 120 trading days. The sample data consists of all insider transactions reported under Form 4 to the SEC of S&P 1500 family firms between 2005 and 2015. The symbols *, ** and *** indicate two-tail significance at the 10%, 5% and 1% levels, respectively. The two bottom rows of the table provide the adjusted R-squared and the sample size for the regressions. All continuous variables are winsorized at the 1st and 99th percentile. The intercept is included in regressions but not reported. The standard errors in parentheses are heteroscedasticity-consistent and clustered at the firm-level. Insider-level and trade-level controls are included in all models but not reported due to space constraints.

DV: BHAR using a Fama-French 3-factor model

	Insider purchases		*Insider sales*	
	(1)	(2)	(1)	(2)
Family member	0.0519	0.0794**	0.0334***	0.0222***
	(0.0742)	(0.0379)	(0.0105)	(0.0085)
Non-corporate insider	-0.00986	-0.0357	0.120**	0.113**
	(0.0637)	(0.0776)	(0.0563)	(0.0502)
Family member*Non-corporate	-0.0639	-0.00728	-0.176***	-0.104*
	(0.1060)	(0.0966)	(0.0632)	(0.0534)
Firm-level controls	Yes	No	Yes	No
F.E. Year	Yes	Yes	Yes	Yes
F.E. Industry	Yes	No	Yes	No
F.E. Firm	No	Yes	No	Yes
Adjusted R-squared	0.101	0.306	0.077	0.216
N	3,871	3,871	33,141	33,141

DV: BHAR using a Carhart 4-factor model

	Insider purchases		*Insider sales*	
	(1)	(2)	(1)	(2)
Family member	0.105**	0.114***	0.0317***	0.0281**
	(0.0488)	(0.0386)	(0.0112)	(0.0113)
Non-corporate insider	0.0266	-0.00139	0.143**	0.137***
	(0.0665)	(0.0851)	(0.0618)	(0.0525)
Family member*Non-corporate	-0.0862	-0.0655	-0.209***	-0.134**
	(0.0947)	(0.1080)	(0.0671)	(0.0549)
Firm-level controls	Yes	No	Yes	No
F.E. Year	Yes	Yes	Yes	Yes
F.E. Industry	Yes	No	Yes	No
F.E. Firm	No	Yes	No	Yes
Adjusted R-squared	0.236	0.425	0.081	0.219
N	3,871	3,871	33,141	33,141

Appendix 1: Insider typology in family firms

This figure presents the insider typology in family firms as applied in our study. The insider typology is mutually exclusive, i.e. there are no overlaps allowed in the four quadrants for the purpose of this study. The term "Family insider" refers to an insider who is related to the founding family of the family firm by either blood, marriage or adoption not more remote than the first cousin. The term "Nonfamily insider" refers to an insider without such family ties to the founding family. The term "Corporate insider" refers to an insider who is either a director, an officer or both a director and an officer at the time of the transaction, irrespective of the insider's shareholdings in the family firm. The term "Non-corporate insider" refers to an insider who is a major shareholder in accordance with the respective SEC insider trading regulations, but holds neither a director nor an officer position at the time of the transaction, thereby reportedly has no active involvement in the family firm's management.

Management involvement	Family member status: Family insider	Family member status: Nonfamily insider
Corporate insider	(1) **Family corporate insider**	(3) **Nonfamily corporate insider**
Non-corporate insider	(2) **Family non-corporate insider**	(4) **Nonfamily non-corporate insider**

Appendix 2: Variable definitions

Buy-and-hold abnormal return (BHAR): Delta between the buy-and-hold stock return of a family firm and the risk-adjusted expected stock return based on the CAPM model over 120 trading days following the insider transaction

Family firm: Binary variable that equals 1 if the founding family (including descendants and heirs of the founding family) holds at least 5% cumulative equity stake, 0 otherwise

Family member: Binary variable that equals 1 if an insider is related to the founding family of the family firm by either blood, marriage or adoption not more remote than the first cousin, 0 otherwise

Non-corporate insider: Binary variable that equals 1 if an insider is a 10% shareholder but neither a director nor an officer at the time of the transaction, 0 otherwise

CEO: Binary variable that equals 1 if the insider holds the position of a CEO at the time of the transaction, 0 otherwise

CFO: Binary variable that equals 1 if the insider holds the position of a CFO at the time of the transaction, 0 otherwise

Chairman: Binary variable that equals 1 if the insider holds the position of a Chairman at the time of the transaction, 0 otherwise

Uncertainty: 250-trade days lagging stock volatility of the firm prior one day to the insider trade

Momentum: 250-trade-days lagging stock return of the firm prior one day to the insider trade

Trade size: Cumulative number of shares traded on the transaction day per insider

Firm size: Natural logarithm of the total number of employees in the firm at the end of the quarter prior to the quarter of the insider trade

Firm valuation: Price-to-book ratio of the firm at the end of the quarter prior to the quarter of the insider trade

Firm profitability: Return on equity of the firm at the end of the year prior to the year of the insider trade

Transaction year: Calendar year of the execution date of insider transaction as reported by the insider

Industry classification: Standard Industrial Classification (SIC) code of the family firm

Appendix 3: Correlation matrix for insider purchases and sales

This table reports pair-wise Pearson correlations between independent variables used in the regression analyzes for insider purchases (sales) transactions below (above) the diagonal. The table includes all insider transactions completed by officers, directors and/or 10% shareholders in all family firms in the S&P 1500 listed at the beginning of 2005 for the period from 2005 until 2015. Continuous variables are winsorized at the 1st and 99th percentile. Note that * $p < 0.05$.

Variables		*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*
(1)	Family member		0.2757*	0.1966*	-0.1581*	0.3381*	-0.0869*	-0.1381*	0.2424*	0.0165*	-0.0710*	-0.0910*
(2)	Non-corporate insider	-0.1088*		-0.1045*	-0.0669*	-0.0893*	-0.0690*	-0.1350*	0.0696*	-0.0507*	-0.0045	-0.0953*
(3)	CEO position	0.5380*	-0.1951*		-0.0895*	0.3958*	0.0293*	0.0196*	0.0588*	-0.0322*	-0.0363*	0.0295*
(4)	CFO position	-0.0989*	-0.1257*	-0.1053*		-0.0769*	0.0200*	0.0446*	-0.0476*	-0.0319*	-0.0106	-0.0027
(5)	Chairman position	0.3863*	-0.1265*	0.3545*	-0.0683*		0.0339*	0.0221*	0.0321*	-0.0216*	-0.0744*	0.0251*
(6)	Uncertainty	-0.0023	0.0075	-0.0537*	-0.0176	0.0439*		0.1457*	-0.0873*	-0.0274*	0.1565*	0.1476*
(7)	Momentum	-0.1536*	0.0820*	-0.1229*	0.0282	-0.0255	0.0104		-0.0469*	-0.0458*	0.0149*	-0.0343*
(8)	Trade size	0.1068*	0.2657*	0.0177	-0.0568*	0.0905*	-0.0131	0.0009		0.2453*	0.0863*	0.1041*
(9)	Firm size	-0.0156	-0.2881*	-0.1107*	-0.0432*	0.0462*	0.0603*	0.0514*	0.0548*		0.0634*	0.2660*
(10)	Firm valuation	-0.0303	-0.0256	-0.0229	-0.0685*	-0.0381*	0.2533*	0.1016*	0.0704*	0.1742*		0.3606*
(11)	Firm profitability	0.0045	-0.2228*	0.0104	0.0021	0.0373*	0.1841*	0.0879*	0.0147	0.3079*	0.4121*	

Appendix 4: Distribution of insider trades by month

This table shows the distribution of insider purchases and sales in family firms made between 2005 and 2015 split by the month when the respective insider trade was transacted. Panel A reports the distribution of transactions by month for corporate insiders. Panel B reports the distribution of transactions by month for non-corporate insiders.

Panel A: Corporate insiders

	(1) Insider purchases				*(2) Insider sales*			
	Family insider		Nonfamily insider		Family insider		Nonfamily insider	
January	35	7.1%	130	4.9%	517	5.5%	1,222	5.7%
February	68	13.7%	258	9.8%	828	8.9%	2,622	12.2%
March	34	6.9%	261	9.9%	915	9.8%	2,246	10.5%
April	13	2.6%	129	4.9%	732	7.8%	1,394	6.5%
May	43	8.7%	326	12.3%	927	9.9%	2,546	11.9%
June	27	5.4%	167	6.3%	683	7.3%	1,431	6.7%
July	24	4.8%	164	6.2%	628	6.7%	1,298	6.1%
August	53	10.7%	398	15.1%	888	9.5%	1,920	9.0%
September	24	4.8%	129	4.9%	627	6.7%	1,423	6.6%
October	27	5.4%	186	7.0%	661	7.1%	1,345	6.3%
November	103	20.8%	350	13.2%	985	10.6%	2,326	10.9%
December	45	9.1%	146	5.5%	943	10.1%	1,644	7.7%
Sum	496	100.0%	2,644	100.0%	9,334	100.0%	21,417	100.0%

Panel B: Non-corporate insiders

	(1) Insider purchases				*(2) Insider sales*			
	Family insider		Nonfamily insider		Family insider		Nonfamily insider	
January	4	8.9%	62	9.0%	118	6.1%	20	4.4%
February	2	4.4%	83	12.1%	171	8.9%	57	12.4%
March		-	94	13.7%	153	7.9%	42	9.2%
April	4	8.9%	23	3.4%	79	4.1%	15	3.3%
May	13	28.9%	41	6.0%	182	9.4%	29	6.3%
June	2	4.4%	33	4.8%	175	9.1%	35	7.6%
July	5	11.1%	79	11.5%	203	10.5%	34	7.4%
August	10	22.2%	73	10.6%	184	9.5%	36	7.9%
September	2	4.4%	40	5.8%	136	7.0%	40	8.7%
October		-	42	6.1%	136	7.0%	22	4.8%
November	2	4.4%	49	7.1%	212	11.0%	79	17.2%
December	1	2.2%	67	9.8%	183	9.5%	49	10.7%
Sum	45	100.0%	686	100.0%	1,932	100.0%	458	100.0%