The Effect of CDS Trading Initiation on Dividend Payout Policy

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May 2017

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Abstract

This study examines whether the initiation of credit default swaps trading affects firm dividend policies. Reduced monitoring by banks following CDS initiation increases the potential for wealth expropriation from equityholders to managers, leading to overinvestment arising from the firm having excess free cash flow. Using a difference-in-difference research design, we predict and find evidence consistent with firms mitigating the increased agency problem following CDS initiation by increasing dividend payout to equityholders. Consistent with the agency explanation for the increase in dividends following CDS initiation, we also find evidence that the increase in dividends is larger for firms with larger free cash flow and for firms whose lead arranger banks have relatively less strong reputations in the loan syndication market. Inferences regarding the increase in dividends are unchanged using a propensity score matched sample. In addition, we find no evidence of a predetermined trend in dividends before CDS trading initiation.

1. Introduction

This study examines whether the introduction of credit default swaps (hereafter CDSs) affects firm dividend policies. The development of CDS markets has had beneficial effects for debt market investors, including providing additional opportunities to hedge credit risk. However, the development also has had an unintended consequence that the ability for creditors to transfer credit risk to other parties reduces creditors' incentives to monitor activities of borrowers. Banks, particularly lead arranger banks in loan syndicates, play an important role in screening and monitoring borrowers. Although such monitoring benefits creditors, prior research suggests that equityholders can also benefit from such monitoring activities. However, the ability of banks to transfer credit risk following CDS initiation likely reduces the ability of equityholders' to rely on banks' monitoring activities. As a result, the agency conflict between managers and equityholders likely increases following CDS initiation.

A classic agency problem that shareholders face is expropriation of their wealth by managers, including excess managerial compensation from misstating firm performance and overinvesting. The potential for overinvestment arises from the firm having excess "free cash flow." An important governance mechanism to address the free cash flow problem is dividend policy (Jensen, 1986). In particular, paying excess free cash flow through dividends can reduce this overinvestment problem. If CDS initiation results in an increase in overinvestment because of reduced monitoring by lenders, then an increase in dividends can be used to mitigate the overinvestment problem. Therefore, we predict and find evidence that firms increase dividends following CDS initiation, with an average increase of $0.079 per share, representing an 18% increase.

To provide more direct evidence of a link between the free cash flow problem and the increase in dividends follow CDS initiation, we test whether the increase in dividends is concentrated among those firms with greater free cash flow, and find evidence that this is the case. We also provide additional evidence that the increase in dividends is concentrated among those borrowing firms whose lead arranger banks have relatively less strong reputations in the loan syndication market, who do not have the same incentive to continue to monitor borrowers' activities following CDS initiation as do those banks with relatively strong reputations. This evidence further supports the agency conflict explanation for the increase in dividends following CDS initiation.

To conduct our tests relating CDS trading initiation to dividend changes, we obtain CDS trading information from Bloomberg and accounting and financial information from Compustat and CRSP. The resulting sample comprises 103,632 firm-years, which spans 1990 to 2014, and includes 685 and 11,284 unique firms with and without CDS trading (12,724 and 90,908 firm-years). We conduct our tests using essentially a difference-in-differences research design that follows Bertrand and Mullainathan (2003) that controls for firm and time fixed effects. In all tests, we also include as controls firm-specific characteristics.

Although our evidence is consistent with the agency conflict explanation, it is possible that dividend increases following CDS initiation are a result of managers' incentives to use dividends to signal better future prospects for the firm. Better future prospects can result from the reduction in a firm's financing frictions following CDS initiation that allows the firm to invest in positive net present value projects that otherwise would not be funded in the absence of CDS trading. Accordingly, it is possible that a positive association between CDS trading and dividend increases is attributable to managers' incentive to signal private information related to

the implementation of additional positive net present value projects. To investigate the validity of the signaling hypothesis for the increase in dividends, we test whether CDS initiation is associated with better future firm performance using two profitability proxies, operating cash flow and operating income. Finding evidence of better performance following CDS initiation is consistent with the signaling explanation. In contrast, we find evidence of lower future performance subsequent to CDS initiation, which is consistent with increased agency costs arising from reduced incentive for lenders to monitor borrowers.

It is also possible that dividend increases following CDS initiation relates to the agency conflict between debtholders and shareholders. Prior studies suggest that dividends could represent a wealth transfer from debtholders to shareholders. The reduced incentive of debtholders to monitor borrowers following CDS initiation could increase incentives for managers to transfer wealth from debtholders to shareholders by increasing dividends. We investigate the validity of the wealth transfer explanation for the increase in dividends by testing whether bond returns surrounding dividend increase announcements decrease following CDS initiation. Findings reveal the opposite in that bond returns are not only positive before and after CDS initiation, but they increase as well after CDS initiation.

A research design problem common to studies on CDS initiation is that CDS initiation is possibly endogenously related to a change in some other unobservable time-varying firm characteristics. To address this possibility, following prior literature, we test for changes in dividends following CDS initiation using a propensity score matched sample. As with the tests based on the full sample of firms, findings from the matched sample test reveal evidence that firms increase dividends following CDS initiation, with an average increase of $0.029 per share. In addition, because we base our tests on a difference-in-differences research design, we also

conduct an additional analysis to test whether there is a pre-determined trend in dividends per share for the CDS traded firms relative to the non-CDS traded firms. Findings reveal no evidence of a predetermined trend.

This study makes two contributions. First, our study extends the literature that examines the effects of credit derivatives on the financial markets (Ashcraft and Santos, 2009; Saretto and Tookes, 2013, Subrahmanyam et al., 2014; Amiram et al., 2017). In particular, our study is the first to provide evidence that CDS trading initiations affect firm dividend policies, which is a central subject of study in corporate finance, in part because dividend payouts can affect firms' real investment decisions. Second, our findings provide evidence in support of the agency explanation for increases in dividend payout. CDS initiation provides a relatively powerful setting to test the agency explanation for dividend payment because the reduced monitoring by banks exacerbates the agency conflicts between managers and equityholders. Our findings show that equityholders take actions to protect themselves when bank monitoring quality deteriorates because of the emergence of credit derivative markets.

The remainder of the paper is organized as follows. Section 2 discusses the related literature and develops our predictions. Section 3 outlines our empirical design, section 4 describes the data and sample, section 5 presents the results, and section 6 summarizes and concludes the study.

2. Related Literature and Predictions

2.1. CDS trading initiation and dividend payout policy

The development of credit default swap markets had beneficial effects for debt market investors including providing additional opportunities to hedge credit risk (Ashcraft and Santos, 2009). However, the development also had an unintended consequence in that the ability for

creditors to transfer credit risk to other parties reduced creditors' incentives to monitor activities of borrowers (e.g., Morrison, 2005). Banks, particularly lead arranger banks in loan syndicates, play an important role in screening and monitoring borrowers. Although such monitoring benefits creditors, prior research suggests that equityholders can also benefit from such monitoring activities. For example, James (1987) finds a positive stock market reaction to loan announcements by borrowers, which is consistent with shareholders benefiting from banks' monitoring. However, the ability of banks to transfer credit following CDS initiation likely reduced the ability of equityholders' to rely on banks' monitoring activities.

Before CDS initiation, shareholders can use a variety of governance mechanisms to reduce agency problems within the firm, specifically as a means to control managerial actions that lead to reduced shareholder welfare. As noted above, an important mechanism on which shareholders can rely was screening and monitoring of a borrower by its lenders.[1] Following CDS initiation, as this governance mechanism becomes less effective, shareholders face a less desirable mix of mechanisms to control managerial actions. To address this situation, firms may implement changes in managerial compensation, board structure, and other governance mechanisms. The new equilibrium governance mechanism mix presumably is more costly to the firm and could manifest as a reduction in future profitability.

A classic agency problem that shareholders face is expropriation of their wealth by managers, including excess managerial compensation from misstating firm performance and overinvesting, i.e., investing in non-profitable activities, which provides private benefits to managers. The potential for overinvestment arises from the firm having excess "free cash flow." An important governance mechanism to address the free cash flow problem is dividend policy

[1] With the development of loan syndication, bank monitoring is typically performed by lead arranger banks (Sufi, 2007).

(Jensen, 1986). In particular, paying excess free cash flow through dividends can reduce this overinvestment problem. However, there is a cost to increasing dividends in that the firm may have to forego current or future positive net present value projects, or have to face costly external financing (Stulz, 1990).

Before CDS initiation, bank monitoring could help minimize the overinvestment problem even in the presence of excess free cash flow. Following CDS initiation, with bank monitoring being reduced, the overinvestment problem is exacerbated. To address this problem, the firm may increase dividends.[2] However, paying larger dividends relative to the case in which bank monitoring takes place before CDS initiation can create an underinvestment problem from having to forego positive net present value projects.

For dividends to be a credible corporate governance mechanism, it is necessary that the payout policy commits the manager to pay out excess free cash flow in the current and future periods. Prior literature establishes that firms are reluctant to cut or omit dividends, i.e., dividends are sticky (Guttman et al., 2010). Given this is the case, if managers increase dividend payout, such an increase represents a long-term commitment not to over-invest. Assuming managers are reluctant to cut or omit dividends, increasing dividend payout creates greater incentive for managers to avoid overinvesting. Overinvesting today could leave the firms with a future cash shortfall, thereby creating pressure to cut or omit dividends, which managers seek to avoid at all cost. As a result, dividends can play an important role in mitigating agency costs

[2] Increasing dividends is not the only action that firms can take to address the increased agency conflicts between managers and equityholders following CDS initiation, but it could be part of the change in mix of governance mechanisms to respond to reduced bank monitoring.

associated with excess free cash flow (Lang and Litzenberger 1989; Faccio et al. 2001; Knyazeva 2008).[3]

The preceding discussion leads to our first prediction that following CDS initiation firms increase dividends. This prediction rests upon the assumption that agency conflicts between managers and equityholders increase following CDS initiation because bank lenders have reduced incentive to monitor managers and the assumption that dividends play an important role in constraining managers' opportunistic behavior.

Furthermore, assuming that agency conflicts are greater for firms with higher free cash flow, we next predict that dividend increases following CDS initiation are greater for firms with higher free cash flow than for firms with lower free cash flow. Alternatively stated, the effect of CDS initiation on dividends is larger for firms with a greater free cash flow problem.

The key assumption underlying our prediction that firms increase dividends following CDS initiation is that lending banks have reduced incentive to monitor because they can transfer credit risk to third parties using CDSs. However, prior research suggests that reputable banks may be less likely to reduce monitoring efforts (Sufi, 2007; Amiram et al., 2017). In particular, because the syndicated loan market is one of repeated interactions, lead arranger banks that engage frequently in the loan market can suffer a loss of reputation if their loans subsequently default (Gopalan et al., 2011). Because monitoring effort is unobservable by syndicated loan market participants, loan default is the signal upon which they rely to infer monitoring effort. Thus, because we expect lead arranger banks with higher reputation are less likely to reduce their monitoring effort, we predict that the effect of CDS initiation on dividend increases is smaller if the lead arranger bank has a stronger reputation in the syndicated loan market.

[3] In using dividends to mitigate the problem of overinvestment, equityholders may have to face an underinvestment problem when positive net present value projects occur but cannot be financed internally.

3. Research Design

3.1 Dividends and CDS initiations

To test our prediction that CDS initiation leads to an increase in dividends, we estimate the following linear regression model given by Eq. (1):

$$DPS_{it} = \beta TradedPost_{it} + \gamma Controls + \alpha_i D_i + \alpha_t D_t + \varepsilon_{it} \quad (1)$$

DPS_{it} is annual dividends per share for firm i in year t.[4] *TradedPost* is an indicator variable that equals one for observations occurring in the year of or following CDS initiation, and zero otherwise. D_i, and D_t are firm- and year-fixed effects. Eq. (1) is essentially a difference-in-differences research design that follows Bertrand and Mullainathan (2003).[5] If CDS initiation is associated with an increase in dividends, then $\beta > 0$.

Controls is a set of control variables for a variety of firm-specific characteristics suggested by prior research to affect dividend payments (Fama and French 2001; Kose et al. 2011). The firm characteristics include lagged dividend per share (*L_DPS*), return on assets (*ROA*), firm size (*SIZE*), the equity market-to-book ratio (*MB*), asset growth (*AG*), sales growth (*SG*), annual stock return volatility (*STD_RET*) and firm age (*AGE*). We also estimate Eq. (1) by clustering standard errors at the firm level.[6] All variables are defined in the Appendix.

A research design problem common to studies on CDS initiation is that CDS initiation is possibly endogenously related to a change in some other unobservable time varying firm

[4] To make sure that dividends per share are comparable across years, we adjust *DPS* for stock splits using the cumulative adjustment factor in CRSP. Using dividends per share rather than dividend yield or dividend payout ratio ensures that the observed changes in *DPS* reflect changes in dividends rather than the deflator (Floyd et al. 2015). However, untabulated results reveal that our main inferences remains unchanged if we use dividend yield and dividend payout ratio as the dependent variable.

[5] Because we cannot assign a specific treatment date for each control firm, we estimate Eq. (1) using the Bertrand and Mullainathan (2003) difference-in-differences design.

[6] We also estimated Eq. (1) clustering by firm and year. Untabulated findings yield the same inferences as those based on tabulated findings. Including the lagged dependent variable in the regression could induce bias to the coefficients of interest. To address this issue, we also estimated Eq. (1) using the Arellano and Bond (1991) Generalized Methods of Moments estimator. Untabulated findings yield the same inferences as those based on tabulated findings.

characteristics. To address this possibility, following prior literature, we estimate Eq. (1) using a propensity score matched sample (e.g., Saretto and Tookes, 2013; Subarhmanyam et al., 2014; Amiram et al., 2017).

To construct the propensity score matched sample, following Ashcraft and Santos (2009), Subrahmanyam et al. (2014) and Amiram et al. (2017), we match each firm that is CDS traded with one that is not based on propensity scores, and then use the firm-year observations of the CDS traded firms and matched non-CDS traded firms to estimate Eq. (1). To do this, we first estimate a probit model with *TradedPost* as the dependent variable and a set of explanatory variables that are assumed to determine the likelihood of CDS trading, which includes return on assets, firm size, the equity market-to-book ratio, stock return volatility, leverage, credit ratings, and whether the firm has credit ratings. We then use the estimated model parameters to calculate propensity scores for each firm.[7] We match, without replacement, each CDS firm to the non-CDS traded firm whose propensity score is closest.[8]

To test whether an increase in dividend payment depends on the agency costs of free cash flow, we estimate Eq. (2):

$$DPS_{it} = \alpha + \beta_1 TradedPost_{it} + \beta_2 FCF_{it} + \beta_3 TradedPost_{it} \times FCF_{it} + \gamma Controls + \alpha_i D_i + \alpha_t D_t + \varepsilon_{it} \quad (2)$$

[7] In addition, although the unit of analysis for Eqs. (1) and (2) is at the firm-year level, following Ashcraft and Santos (2009), Subrahmanyam et al. (2014) and Amiram et al. (2017), we match each CDS traded firm to a non-CDS traded firm based on firm characteristics for both sets of firms as of the quarter in which CDS initiation occurs. To obtain a sample for estimating propensity scores, we use firm-quarter observations. We estimate the propensity score model using all CDS traded firms' quarterly observations between 2001 and the date of CDS initiation for each firm; and all potential control firms' quarterly observations between 2001 and the last sample quarter, quarter 4 of 2014. Following Ashcraft and Santos (2009), we begin the propensity score estimation sample in 2001 because this is the earliest year in which a CDS initiation occurs in our sample.

[8] Untabulated statistics reveal that the number of CDS traded firms used in the propensity score matched sample tests is 516. The loss of 179 firms is largely attributable to missing data for CDS-traded firms necessary to estimate the probit model of the likelihood of CDS trading.

Eq. (2) modifies Eq. (1) by including a measure of free cash flow, FCF, and its interaction with $TradedPost$. Based on the prediction in section 2 that the effect of CDS initiation on dividends is larger for firms with a greater free cash flow problem, we predict β_3 is positive.[9]

Following Demirgüç-Kunt and Maksimovic (1998), Leuz et al. (2008), we measure *FCF* as $ROA/(1-ROA)$ minus industry median total asset growth. *FCF* reflects the excess cash flow that managers may be able to redirect to create private benefits.[10] *FCF* exhibits high values for firms that internally generate a large amount of cash flow but have few investment opportunities and hence are more prone to free cash problems. An advantage of this measure is that it takes into account both firms' ability to generate cash and their growth prospects.[11]

To test whether CDS traded firms that are monitored by more reputable lead banks increase dividends to a lesser extent than CDS traded firms monitored by less reputable lead banks, we estimate Eq. (3):

$$DPS_{it} = \alpha + \beta_1 TradedPost\_REPH_{it} + \beta_2 TradedPost\_REPL_{it} + \gamma Controls + \alpha_i D_i + \alpha_t D_t + \varepsilon_{it} \quad (3)$$

Eq. (3) modifies Eq. (1) by partitioning CDS traded firms into two groups, one with reputable lead banks and one with less reputable banks. *Tradedpost_REPH* equals one if an observation occurs in the year of CDS initiation or thereafter and the firm has a lending relationship with a

[9] For ease of exposition, we use the same notation for coefficients and error terms in Eq. (1) and Eq. (2), as well as equations that follow. In all likelihood they differ.

[10] $ROA/(1-ROA)$ reflects the maximum growth rate of a firm if it only relies on internal financing. To see this, let *x* be the firm's external financing needs and *b* be the faction of earnings, *E*, retained for investment. Thus, $x = g \times ASSETS - (1+g) \times E \times b$, where g is a firm's growth rate. Setting *x* and b to zero and one, i.e., the situation when a firm only internally finances its projects and has no payout of earnings, then $g = E/(A-E)$, or equivalently, $g = ROA/(1-ROA)$. In addition, the industry median asset growth rate can be interpreted as an estimate of the long-term growth rate in equilibrium for firms in an industry. As a result, *FCF* measures the extent to which a firm's capacity to generate funds internally exceeds its long-term equilibrium growth rate. The greater the value, the higher is the probability that the firm generates excess funds.

[11] We also use a second measure of free cash flow that is commonly calculated as operating cash flow less capital expenditure, deflated by beginning-of-year total assets (Richardson 2006). Untabulated findings reveal the same inferences as those based on tabulated findings.

reputable lead bank in the year of CDS initiation, and equals zero otherwise. Similarly, *Tradedpost_REPL* equals one if an observation occurs in the year of CDS initiation or thereafter and the firm has no lending relationship with a reputable lead bank in the year of CDS initiation, and equals zero otherwise. Follow Ball et al. (2008), we classify a bank as having a high (low) reputation if it is among the top 25 lead arranger banks in terms of market share in the U.S syndicated loan market.[12] Based on the prediction in section 2 that the effect of CDS initiation on dividends is smaller for firms whose lead arranger banks have a stronger reputation in the loan syndication market, we predict $\beta_2 > \beta_1$.

4. Sample and data

Our sample comprises all firm-year observations in Compustat between 1990-2014 and CRSP with data necessary to estimate Eqs (1) through (3).[13] In addition, following prior research, we exclude financial and utility firms—Standard Industrial Classification (SIC) codes 6000–6999 and 4900–4949—(Kose et al., 2011; Floyd et al., 2015). This results in a sample of 103,632 firm-years.

We use the following steps to identify CDS initiations for the firms in our sample. First, we identify all the firms in the sample that ever had a CDS traded on their debt according to Bloomberg. Next, for every such firm we identify the earliest date in which a five-year-to maturity, U.S.-dollar-denominated CDS contract is traded. We use this date as the date of the onset of CDS trading. Based on this procedure, we identify 685 CDS and 11,284 non-CDS traded firms, which corresponds to 12,724 and 90,908 firm-years for CDS and non-CDS traded firms. If a firm is referenced by a CDS contract during our sample period, regardless of the year

[12] Market share in the loan syndication market is commonly employed as a measure of bank reputation. See, e.g., Sufi (2007) and Amiram et al. (2017).
[13] To estimate Eq. (3), we obtain lead arranger bank information from Dealscan and SDC Platinum.

of CDS initiation, it is included in the CDS traded group during the entire sample period. All other firms are included in the control group. Because the CDS initiation date is staggered over time for CDS traded firms, for a given year in which there is a CDS initiation, the control group also includes CDS traded firms that do not have CDS initiation in that year (Bertrand and Mullainathan, 2003).

Table 1, Panels A and B, presents the distribution of CDS and non-CDS traded firm-year observations by year and industry. Panel A reveals that the percentage of CDS traded firms ranges from a low of 9.03% in 1996 to a high of 15.47% in 2004/2005. Panel B reveals that the percentage of CDS traded firms ranges from a low of 6.47% for firms in the Business Equipment industry to a high of 37.04% for firms in the Chemicals and Allied Products industry.

Table 2 presents summary statistics for treatment and control firm-years for the full sample. Panel A presents statistics combining all firm-years; panel B presents statistics before and after CDS initiation for CDS traded firms using all firm-years; panel C presents statistics for the propensity score matched sample before and after CDS initiation for CDS traded and matched non-CDS traded firms. Panel A reveals that CDS traded firms, are significantly different from non-CDS traded firms along several dimensions.[14] In particular, on average, they have larger dividends per share (mean *DPS* difference = 0.3248), are larger (mean *SIZE* difference = 3.2695), are more profitable (mean *ROA* difference = 0.1244), are older (mean *AGE* difference = 11.9467). However, CDS traded firms exhibit slower growth (mean *SALES_GROWTH* difference = –0.0412, mean *ASSET_GROWTH* difference = –0.1450), a lower equity market-to-book ratio (mean *MB* difference = –0.2141), lower annual stock return volatility

[14] Throughout, when discussing a coefficient or summary statistic, we use the term significant to denote a 5% significance level under a two-sided alternative.

(mean *STD_RET* difference = –0.0198) and have a more severe free cash flow problem (mean difference *FCF* = 0.0804).[15]

Panel B reveals that dividends increase both statistically and economically after CDS initiation for CDS traded firms. In particular, mean *DPS* increases from 0.3245 to 0.5862. Untabulated statistics relates to the propensity score matched sample also reveals that dividends increase both statistically and economically after CDS initiation not just for CDS traded firms but also for non-CDS traded firms. In particular, mean *DPS* increases from 0.312 to 0.411 and from 0.259 to 0.321 for CDS traded and non-CDS traded firms. These statistics are consistent with prior studies indicating that dividends exhibit a trend in years that overlap with over our sample period (Floyd et al., 2015). The use of the difference-in-differences research design with time fixed effects mitigates the effect of dividend trends on our inferences.

Panels B also indicates that after CDS initiation, CDS traded firms become larger (mean *Size* difference = 1.1043), have slower sales growth (mean *SALES_GROWTH* difference = −0.0743), and have more free cash flow (mean *FCF* difference = 0.0214). More importantly, untabulated statistics reveal that for the propensity score matched sample, there are few significant differences in firm characteristics between CDS and non-traded firms using all sample years. As in prior research, CDS traded and matched non-CDS traded firms are significantly larger (Ashcraft and Santos, 2009; Subrahmanyam et al., 2014; Amiram et al. 2017). The effects of this difference are mitigated by including firm size when estimating Eq. (1).

[15] A key assumption of our research design is that the dependent variable in Eq. (1) follows a parallel trend for CDS and non-CDS traded firms. However, the statistics in panel A showing that CDS traded firms differ significantly from non-CDS traded firms along several dimensions suggests the possibility that the parallel trend assumption may not hold. Therefore, as discussed in section 5.2 below, we conduct a pre-determined trend test (e.g., Heider and Ljungvist, 2015; Amiram et al., 2017).

5. Results

5.1. CDS initiations and dividend changes

Table 3, Columns 1 and 3, reports the regression results associated with estimation of Eq. (1) for the full and matched sample. The key finding is that the coefficient on *TradedPost TradedPost* is 0.0795 with a t-statistic of 6.94. This coefficient is not only statistically significant but also economically significant. Specifically, the coefficient on *TradedPost* implies that on average the dividend increases of CDS traded firms following CDS initiation are 0.0795dollar per share higher than those of controlling firms, which is almost 20 percent of the sample mean for CDS firms before CDS initiations. When we estimate Eq. (1) for the matched sample, the coefficient on *TradedPost* is 0.0293 with a t-statistic of 2.91. Finding a significant coefficient on *TradedPost* for both samples lends support to our conjecture that there is a positive association between CDS initiations and dividend increases.

5.2. Testing for a pre-determined trend

The finding in Table 2, Panel A, showing that CDS traded firms have different firm characteristics before and after CDS initiation, raises the question of whether there is a pre-determined trend in dividends for the CDS traded firms relative to the non-CDS traded firms. Existence of such a trend could call into question the parallel trend assumption that underlies the difference-in-differences design of Eq. (1). If there is a predetermined trend, then such a trend likely begins before CDS initiation, which should manifest as an increase in dividends immediately preceding CDS initiation (e.g., Heider and Ljungvist, 2015; Amiram et al., 2017). Therefore, we modify and estimate Eq. (1) by including an indicator variable that equals one if the firm-year observation is the year before CDS initiation, and zero otherwise. In this estimation, the coefficient on this indicator variable reflects the difference in dividends in the

year before CDS initiation and those that preceded it. Therefore, finding that this coefficient is not different from zero provides evidence in support of the parallel trend assumption in our tests.

Table 3, column 2, which presents the finding from the estimation. Findings reveal that the indicator variable's coefficient, 0.0048, is insignificant (t-statistic = 0.43), which means that for CDS traded firms dividends in the year before CDS initiation are not significantly different from those in prior years relative to non-CDS traded firms. The findings in Table 3 also reveal that the indicator variable's coefficient is significantly smaller than the *TradedPost* coefficient, 0.0802, which means that dividends following CDS initiation are significantly larger than in the year prior to CDS initiation. Taken together these findings not only increase our confidence that the observed increases in dividends are not attributable to predetermined trends surrounding CDS initiation, but also increase our confidence that CDS initiation is the underlying event that affected the observed changes in dividend policy.

5.3. CDS trading and agency costs: free cash flow and lead arranger reputation

Table 4, Columns 1, 2, and 3, presents the regression results associated with estimation of Eq. (1) separately for firms with *FCF* above and below the sample median, and for Eq. (2). The findings in the first two columns reveal that the *TradedPost* coefficients for firms above and below the median *FCF* are 0.0838 and 0.0378, each of which is significantly positive. Hence, even firms with relatively low free cash flow significantly increase dividends following CDS initiation. The significantly positive *TradedPost*$\times$ *FCF* (t-statistic of 2.25) indicates that the *TradedPost* difference of 0.1848 is significant. Thus, firms with high free cash flow tend to increase dividends more than those with low free cash flow after CDS initiations. Therefore, Table 4 provides evidence that CDS firms with higher agency issues, as reflected in free cash

flows, increase their dividends more than those with lower agency issues in the period after CDS initiations.

Table 5, Columns 1, 2, and 3, presents the regression results associated with estimation of Eq. (1) separately for CDS traded firms whose lead arranger has relatively high and low reputation, i.e., firms in the *REP_H* and *REP_L* subsamples, for Eq. (3). The findings in the first two columns reveal that the *TradedPost* coefficients for firms in the *REP_H* and *REP_L* subsamples are 0.0703 and 0.1433, each of which is significantly positive. Hence, even firms whose lead arrangers have relatively high reputations in the syndicated loan market significantly increase dividends following CDS initiation. The findings in the third column reveal that the coefficients on *TradedPost*$\times$ *REP_L* and *TradedPost*$\times$ *REP_H* are 0.1288 and 0.0663, and the difference is significantly positive (F-statistic = 7.21). Thus, firms with less reputable lead arrangers tend to increase dividends more than those with more reputable lead arrangers after CDS initiations. Thus, the evidence is consistent with the conjecture that the reputation of lead arrangers mitigates the effects of reduced monitoring intensity on firm dividend increases.

5.4. Alternative explanations for dividend increases following CDS initiation

5.4.1 Signaling

Miller and Rock (1985) shows that managers use dividends to signal their private knowledge with respect to the firm's future profitability. Aharony and Swary (1980) finds that stock prices positively react to dividend increases and interpret this as evidence consistent with the Miller and Rock (1985) signaling model. It is possible that dividend increases following CDS initiation are the result of managers' incentives to use dividends to signal better future prospects for the firm. Better future prospects can result from the reduction in a firm's financing frictions following CDS initiation that allows the firm to invest in positive net present value

projects that otherwise would not be funded in the absence of CDS trading. In this regard, Bolton and Oehmke (2011) and Danis and Gamba (2016) provide theoretical support for the notion that firms invest more and increase leverage following CDS initiation because the presence of CDSs increases the ability of lenders to hedge credit risks. Similarly, Saretto and Tookes (2013) suggests that firms with CDSs can borrow more and maintain higher leverage ratios, and provides empirical evidence for the predicted leverage increase following CDS initiation. Accordingly, it is possible that a positive association between CDS trading and dividends is attributable to managers' incentives to signal private information related to the implementation of additional positive net present value projects.

To investigate the empirical validity of the signaling hypothesis for the increase in dividends, we test whether CDS initiation is associated with higher future firm performance. Finding evidence of better performance following CDS initiation is consistent with the signaling explanation. In contrast, finding lower future performance subsequent to CDS initiation is consistent with increased agency costs arising from reduced incentive for lenders to monitor borrowers. To test the effect of CDS initiation on firm performance, we estimate the following equation:

$$Performance_{it} = \beta TradedPost_{it} + \gamma Controls + \alpha_i D_i + \alpha_t D_t + \varepsilon_{it} \quad (4)$$

We estimate two versions of Eq. (4) in which the dependent variable, *Performance*, is either $OPTINC$, operating income before extraordinary items divided by market value of equity; OCF, or operating cash flow divided by market value of equity. Following Aboody et al. (2010), we include several variables as controls for determinants of performance. These include firm size ($SIZE$), leverage (LEV) and growth (MB), year and firm fixed effects. Finding a positive $TradedPost$ coefficient, β, is consistent with firm performance increasing after CDS

initiation and is evidence that managers increase dividends to signal better future performance following CDS initiations. Conversely, finding a negative *TradedPost* coefficient is consistent with increased agency costs arising from reduced incentive for lenders to monitor borrowers.

Table 6 presents the results associated with estimation of Eq. (4) using each of the two performance measures. Contrary to the prediction of a signaling explanation for the increase in dividends following CDS initiation, the findings in Table 6 reveal that firm performance declines following CDS initiation. In particular, each of the two *TradedPost* coefficients is significantly negative (coefficients = –0.0105, and –0.0228; t-statistics = –1.77, and –4.94). These findings suggest that CDS traded firms actually experience a relative decrease in performance following CDS initiation, which is consistent with the free cash flow explanation for dividend increases.

5.4.2 Wealth transfer from debt holders to shareholders

Another possible reason for dividend increases following CDS initiation relates to the agency conflict between debtholders and shareholders. Prior studies suggest that dividends represent a wealth transfer from debtholders to shareholders (Dhillon and Johnson, 1994). The reduced incentive of debtholders to monitor borrowers following CDS initiation could increase incentives for managers to transfer wealth from debtholders to shareholders by increasing dividends. Hence, the increase in dividends following CDS initiation could also be attributable to this wealth transfer explanation.

Prior literature provides mixed evidence regarding bond price reactions to dividend increases (Handjinicolaou and Kalay 1984; Dhillon and Johnson 1994). However, if CDS initiation increases the wealth transfer problem for debtholders, then the bond price reaction to dividend increases should be more negative or less positive following CDS initiation. Therefore,

to investigate the empirical validity of the wealth transfer explanation for the increase in dividends, we estimate the following equation:[16]

$$BondReturn_{it} = \beta TradedPost_{it} + \gamma Controls + \alpha_i D_i + \alpha_t D_t + \varepsilon_{it} \quad (5)$$

We predict β is negative if the wealth transfer explanation is valid. *BondReturn* is the treasury-adjusted bond return for the days immediately surrounding the dividend increase announcement for each firm-year. We compute this adjusted bond return by first calculating the firm's total bond return (change in bond price plus accrued interest). We require bond issues to be traded at least once during the 10 trading days before the dividend announcement and at least once during the 10 trading days after the dividend announcement. If more than one trade is available during the [−10, −2] and [+2, +10] intervals, we retain trades that are closest to days −2 and +2 respectively. We then we adjust these returns by subtracting the contemporaneous U.S. treasury return (Easton et al. 2009) by matching each bond issue in the Mergent FISD database with a treasury bond in the CRSP database that has similar remaining time to maturity and that has a similar annual coupon rate.[17] To avoid contaminating effects of earnings announcements, we delete dividend increase announcements for which earnings are declared within 10 trading days surrounding the dividend announcement date.

Table 7, Panel A reveals that for CDS traded firms, the mean *BondReturn* increases from –0.0013 to 0.0011. This finding is inconsistent with the wealth transfer prediction of a decrease in bond price reactions following CDS initiation. In addition, Panel B, which presents findings from estimation of Eq. (5) also contradict the prediction of the wealth transfer hypothesis. In

[16] We estimate equation (4) using the full sample but not the matched sample because the number of potential matched sample observations is extremely small (10 firm-year observations).

[17] Because the return accumulation intervals can differ across firms based on the availability of trades, we scale the return measure by the number of trading days in the accumulation interval. When there are multiple bonds trading simultaneously for a firm, we pick a random "representative" bond and use the return on that bond only (Klein and Zur 2011; Dhillon and Johnson 1994).

particular, the *TradedPost* coefficient in Column (2), 0.0012, is positive and insignificantly different from zero.

7. Conclusion

This study examines whether the introduction of credit default swaps affects firm dividend policies. Although the development of CDS markets had beneficial effects for debt market investors, e.g., bank lenders, including providing additional opportunities to hedge credit risk, there was an unintended consequence that the ability to transfer credit risk reduced creditors' incentives to monitor activities of borrowers. Because equityholders can also benefit from such monitoring activities, the reduced monitoring following initiation potentially had negative effects on equityholders. In particular, reduced monitoring increases the potential for wealth expropriation by managers, leading to overinvestment arising from the firm having excess free cash flow. We posit and find evidence consistent with firms mitigating the increased agency problem following CDS initiation by increasing dividend payout to equityholders. We compare dividend payout before and after CDS initiation employing a difference-in-differences research design. We also test for and find no evidence of a predetermined trend in dividends before CDS trading initiation, which supports the parallel trend assumption underlying the difference-in-differences methodology. In addition, the inference that dividends increase following CDS initiation remains unchanged based on tests employing a propensity score matched sample.

We provide more direct evidence of a link between the agency explanation for the increase in dividends following CDS initiation by testing and finding evidence that the increase in dividends is larger for firms with a greater free cash flow problem and for firms whose lead arranger banks have relatively less strong reputations in the loan syndication market.

We conduct additional tests to evaluate whether alternative explanations can explain the increase in dividends. First, we test whether CDS initiation is associated with higher future firm performance using two profitability proxies, operating cash flow and operating income. Finding evidence of better performance following CDS initiation is consistent with a signaling explanation. In contrast, we find evidence of lower future performance subsequent to CDS initiation, which is consistent with increased agency costs arising from reduced incentive for lenders to monitor borrowers. Second, we test whether the increase in dividends following CDS initiation reflects a wealth transfer from bondholders to equityholders that result from the reduced monitoring by banks. We find that bond returns surrounding dividend increase announcements following CDS initiation are not only positive and increase after CDS initiation, which is inconsistent with the wealth transfer explanation.

Taken together, our study's findings provide evidence in support of the agency explanation for increases in dividend payout following CDS. Although dividend policy can be used to mitigate the increased agency conflicts between managers and equityholders when bank monitoring quality deteriorates because of the emergence of credit derivative markets, it is likely that equityholders can take additional actions to protect themselves. Future research can investigate how the mix of governance mechanisms adjust in response to changes in the firm's economic environment that alter the intensity of agency conflicts between managers and equityholders.

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Appendix: Variable definitions

Variable	Measurement
DPS	Annual dividends per share, adjusted by the cumulative adjustment factor in CRSP
TradedPost	An indicator variable that equals one for observations occurring in the year of or following CDS initiation, and zero otherwise
SIZE	The logarithm of market capitalization
MB	Market value divided by the book value of equity
ASSET_GROWTH	Year-to-year changes in total assets deflated by the previous year total assets
SALES_GROWTH	The sale revenue growth rate over the most recent 3-year window, at least two sales revenue figures are required
ROA	Earnings before extraordinary items deflated by the book value of total assets
STD_RET	The standard deviation of daily stock returns over a fiscal year period
AGE	The number of years since the earliest trading date in CSRP
FCF	Free cash flow measured by *ROA/(1-ROA)*minus industry median total asset growth
Tradedpost_REPH	An indicator variable that equals one if an observation occurs in the year of CDS initiation or thereafter and the firm has a lending relationship with a reputable lead bank in the year of CDS initiation, and equals zero otherwise
Tradedpost_REPL	An indicator variable that equals one if an observation occurs in the year of CDS initiation or thereafter and the firm has no lending relationship with a reputable lead bank in the year of CDS initiation, and equals zero otherwise.
OPTINC	Operating income before extraordinary items divided by the market value of equity
OCF	Operating cash flow divided by the market value of equity
LEV	Book value of debt divided by the book value of total assets
BondReturn	The treasury-adjusted bond returns for the days immediately surrounding the dividend increase announcement for each firm-year
LAST_BEFORE_CDS1	An indicator value that equals one if an observation is in the year before CDS initiation, otherwise 0.

Table 1: Sample Description

Panel A: CDS and Non-CDS traded firms across years

Fiscal year	CDS firms	Non-CDS firms	Perct
1990	298	2,454	10.83%
1991	390	3,683	9.58%
1992	400	3,827	9.46%
1993	437	4,254	9.32%
1994	462	4,509	9.29%
1995	490	4,725	9.40%
1996	502	5,060	9.03%
1997	531	5,237	9.21%
1998	538	4,846	9.99%
1999	559	4,450	11.16%
2000	576	4,227	11.99%
2001	609	4,131	12.85%
2002	618	3,773	14.07%
2003	624	3,504	15.12%
2004	607	3,317	15.47%
2005	603	3,294	15.47%
2006	581	3,195	15.39%
2007	558	3,135	15.11%
2008	525	3,040	14.73%
2009	514	2,928	14.93%
2010	497	2,804	15.06%
2011	486	2,748	15.03%
2012	467	2,698	14.76%
2013	452	2,667	14.49%
2014	400	2,402	14.28%
Sum	*12,724*	*90,908*	*12.28%*

Panel B: CDS and Non-CDS traded firms across industries

Industry	CDS firms	Non-CDS firms	Perct
Business Equipment	1,501	23,198	6.47%
Chemicals and Allied Products	763	2,060	37.04%
Consumer Durables	420	2,710	15.50%
Consumer NonDurables	1,138	5,556	20.48%
Energy	1,329	4,477	29.69%
Healthcare, Medical Equipment, and Drugs	1,109	12,168	9.11%
Manufacturing	2,169	11,046	19.64%
Other	2,018	15,514	13.01%
Shops Wholesale and Retail	1,292	10,922	11.83%
Telephone and Television Transmission	985	3,257	30.24%
Sum	*12,724*	*90,908*	*12.28%*

Table 2: Descriptive statistics

Panel A: CDS traded firms VS non-CDS traded firms

	All Observations (N=103,632)		CDS traded firms (N=12,724)		non-CDS traded firms (N=90,908)		
Variable	Mean	Std Dev	Mean (A)	Std Dev	Mean (B)	Std Dev	Diff. A-B
Firm Characteristics							
DPS	0.1664	0.4427	0.4513	0.6317	0.1265	0.3932	0.3248***
SIZE	5.2369	2.2704	8.105	1.6262	4.8355	2.0479	3.2695***
MB	2.1354	2.603	1.9476	1.7249	2.1617	2.7022	-0.2141***
ROA	-0.0567	0.4696	0.0525	0.1159	-0.0719	0.4976	0.1244***
ASSET_GROWTH	0.2858	5.6261	0.1586	0.6636	0.3036	6.0016	-0.1450***
SALES_GROWTH	0.1443	0.3198	0.1081	0.1882	0.1493	0.3338	-0.0412***
STD_RET	0.0423	0.0267	0.025	0.014	0.0448	0.0272	-0.0198***
AGE	13.0718	12.1221	23.5517	16.2272	11.605	10.6365	11.9467***
FCF	-0.0705	0.2223	-0.0000	0.1390	-0.0804	0.2298	0.0804***
L_DPS	0.1577	0.4323	0.4256	0.6151	0.1202	0.3855	0.3054***

Panel B: Firm characteristics before and after CDS initiation for CDS traded firms

	Before CDS initiation (N=6,559)		After CDS initiation (N=6,165)		
Variable	Mean (A)	Std Dev	Mean (B)	Std Dev	Diff. A-B
Borrower Characteristics					
DPS	0.3245	0.5310	0.5862	0.6989	-0.2617***
SIZE	7.5699	1.5780	8.6742	1.4766	-1.1043***
MB	2.1269	2.2270	1.7567	0.8913	0.3702***
ROA	0.0541	0.1296	0.0508	0.0992	0.0033
ASSET_GROWTH	0.2241	0.8451	0.0889	0.3739	0.1352***
SALES_GROWTH	0.1441	0.2146	0.0698	0.1458	0.0743***
STD_RET	0.0259	0.0133	0.024	0.0147	0.0019***
AGE	19.5518	14.6072	27.8073	16.774	-8.2555***
FCF	-0.0104	0.1533	0.0110	0.1210	-0.0214***
L_DPS	0.3153	0.5319	0.5429	0.6731	-0.2276***

Note: *, ** and *** indicate significance at the10%, 5% and 1% level, respectively. Variables are defined in the Appendix.

Table 3: CDS initiations and dividend changes

VARIABLES	(1) *DPS*	(2) *DPS*	(3) *DPS*
TradedPost	0.0795***	0.0802***	0.0293***
	(6.94)	(6.70)	(2.91)
LAST_BEFORE_CDS1		0.0048	
		(0.43)	
SIZE	0.0230***	0.0230***	0.0361***
	(14.78)	(14.73)	(6.98)
MB	-0.0010***	-0.0010***	-0.0004
	(-3.52)	(-3.52)	(-0.27)
ROA	0.0046***	0.0046***	0.0034
	(3.30)	(3.30)	(0.28)
ASSET_GROWTH	-0.0002	-0.0002	-0.0080**
	(-1.59)	(-1.59)	(-2.11)
SALES_GROWTH	-0.0023	-0.0023	0.0605***
	(-0.72)	(-0.73)	(3.08)
STD_RET	-0.2054***	-0.2057***	-2.1765***
	(-3.72)	(-3.73)	(-5.57)
AGE	0.0149	0.0149	-0.0007
	(1.14)	(1.14)	(-0.02)
L_DPS	0.5108***	0.5108***	0.6700***
	(31.62)	(31.61)	(28.27)
Observations	103,632	103,632	18,080
R-squared	0.758	0.758	0.808
Year + Firm FE	YES	YES	YES

Note: *t*-statistics in parentheses are based on standard errors clustered by firm. *, ** and *** indicate significance at the10%, 5% and 1% level. Variables are defined in the Appendix.

Table 4: The effect of CDS initiation on dividends: does free cash flows matter

VARIABLES	(1) *DPS*	(2) *DPS*	(3) *DPS*
TradedPost	0.0838***	0.0378**	0.0779***
	(6.25)	(2.23)	(6.89)
FCF			0.0145**
			(2.13)
TradedPost × FCF			0.1848**
			(2.25)
SIZE	0.0287***	0.0148***	0.0227***
	(8.43)	(8.97)	(14.47)
MB	-0.0016	-0.0009***	-0.0010***
	(-1.48)	(-3.53)	(-3.62)
ROA	0.1070***	0.0038***	0.0010
	(3.72)	(2.94)	(0.58)
ASSET_GROWTH	-0.0128**	-0.0001	-0.0002*
	(-2.31)	(-1.10)	(-1.88)
SALES_GROWTH	0.0067	-0.0078**	-0.0024
	(0.63)	(-2.40)	(-0.78)
STD_RET	-0.4505***	-0.2288***	-0.1976***
	(-3.47)	(-3.72)	(-3.57)
AGE	0.0315	0.0041	0.0148
	(1.42)	(0.32)	(1.14)
L_DPS	0.5089***	0.4727***	0.5099***
	(24.94)	(17.10)	(31.62)
Observations	51,816	51,816	103,632
R-squared	0.787	0.757	0.758
Year + Firm FE	YES	YES	YES

Note: *t*-statistics in parentheses are based on standard errors clustered by firm. *, **, and *** indicate significance at the10%, 5% and 1% level. Variables are defined in the Appendix. Column (1) and column (2) present the results where we estimate the model for observations with high and low free cash flows.

Table 5: The effect of CDS initiation on dividends: does lead arranger bank reputation matter

VARIABLES	(1) *DPS*	(2) *DPS*	(3) *DPS*
TradedPost _REPH	0.0703***		0.0663***
	(5.56)		(5.35)
TradedPost _REPL		0.1433***	0.1288***
		(6.73)	(6.48)
SIZE	0.0253***	0.0230***	0.0251***
	(15.08)	(14.03)	(14.98)
MB	-0.0023***	-0.0020***	-0.0023***
	(-3.49)	(-3.06)	(-3.45)
ROA	0.0074**	0.0062*	0.0070**
	(2.14)	(1.79)	(2.00)
ASSET_GROWTH	-0.0091***	-0.0079***	-0.0088***
	(-9.46)	(-8.53)	(-9.04)
SALES_GROWTH	0.0004	0.0028	0.0028
	(0.13)	(0.93)	(0.91)
STD_RET	-0.1559***	-0.1206**	-0.1417***
	(-3.07)	(-2.43)	(-2.78)
AGE	0.0083	0.0195**	0.0143
	(0.82)	(2.46)	(1.36)
L_DPS	0.5065***	0.4719***	0.5189***
	(32.56)	(29.73)	(34.45)
Test: *TradedPost_REPH = TradedPost_REPH*			F=7.21 p=0.007
Observations	102,078	99,021	103,632
R-squared	0.758	0.754	0.764
Year + Firm FE	YES	YES	YES

Note: *t*-statistics in parentheses are based on standard errors clustered by firm. *, **, and *** indicate significance at the10%, 5% and 1% level. Variables are defined in the Appendix.

Table 6: The effect of CDS trading initiation on firm performance

VARIABLES	(1) *OPTINC*	(2) *OCF*
TradedPost	-0.0105*	-0.0228***
	(-1.77)	(-4.94)
L_SIZE	0.0432***	0.0232***
	(8.92)	(9.27)
L_MB	-0.0348***	-0.0190***
	(-8.85)	(-9.04)
L_LEV	-0.2018***	-0.1243***
	(-4.23)	(-5.93)
Observations	99,457	98,885
R-squared	0.559	0.621
Year + Firm FE	YES	YES

Note: *t*-statistics in parentheses are based on standard errors clustered by firm. *, **, and *** indicate significance at the10%, 5% and 1% level. Variables are defined in the Appendix.

Table 7: Bond price reaction to dividend increases

Panel A: Bond returns around dividend increase announcements before and after CDS initiation for CDS traded firms.

	Pre-CDS period			Post-CDS period		
Variable	Mean	STD	N	Mean	STD	N
BondReturn	-0.0013	0.0230	61	0.0011	0.0221	318

Panel B: Multivariate regression for CDS and non-CDS traded firms

VARIABLES	(1) *BondReturn*	(2) *BondReturn*
TradedPost	0.0015	0.0012
	(0.66)	(0.54)
MB		-0.0012
		(-0.59)
ROA		0.0061
		(0.20)
ASSET_GROWTH		-0.0032
		(-0.84)
SALES_GROWTH		-0.0007
		(-0.06)
STD_RET		-0.0722
		(-0.33)
AGE		-0.0000
		(-0.83)
Observations	583	571
R-squared	0.101	0.106
Year + Industry FE	YES	YES

Note: All variables are defined in Appendix. ***, **, * indicate significance at the10%, 5% and 1% level.