

Value Relevance of Financial and Non-Financial Information: Evidence from the Gaming Industry

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Abstract

Using financial and non-financial data from casino gaming firms listed in the United States from 1999–2017, we explore two research questions: (1) Is financial information value relevant to financial markets in the casino gaming industry? (2) Does non-financial information have incremental explanatory power over financial information? In general, we find that accounting numbers can explain a firm's market value and stock returns in the casino gaming industry, except for accounting accruals, which may behave differently compared to other industries. We also find that non-financial information, such as the number of table games, number of slot machines, and their relative proportion, have significant value relevance in explaining market valuation. Our findings contribute to a better understanding of the value relevance of financial and non-financial information in the casino gaming industry. We also provide analysis of firms characterized by these non-financial attributes.

Keywords: hospitality, casino, gaming, value relevance, table games, slot machines

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Understanding how the stock markets use financial and non-financial information is of core importance to companies, investors, regulators, and other stakeholders. “Value relevance,” or the ability of a firm’s financial and non-financial information to explain and predict firm value and stock prices, is a key topic in accounting and financial research. Information is considered value relevant to investors if it informs their investment decision-making, and the relationships between information, firm value, and stock prices can also be informative for accounting standard-setters and financial regulators when implementing policy. In this study, we examine the power of financial and non-financial information to explain stock market valuation and stock returns in a subset of firms in the hospitality industry, namely casino gaming firms. Prior research in accounting and finance has examined the relationship between accounting information and stock market prices and returns (Francis & Schipper, 1999; Sami & Zhou, 2004) and found that primary financial information such as earnings, book value of assets, and cash flows contributes to explaining market values (Ou & Penman, 1989; Lev, 1989; Collins et al., 1997; Francis & Schipper, 1999; Lev & Zarowin, 1999; Landsman & Maydew, 2002). In addition, studies have found that accounting accruals have incremental explanatory power for market values and stock returns (Rayburn, 1986; Dechow, 1994; Barth et al., 1999).

Recent evidence indicates that financial information has become less value relevant over time, as business models evolve. Researchers have therefore started to examine the value relevance of non-financial information. Amir and Lev (1996) document that financial and non-financial information are complementary, and several studies even find that non-financial information is more relevant than financial information (Graham et al., 2001; Ittner & Larcker, 1998; Hughes, 2000; Riley et al., 2003).

In this study, we use both financial and non-financial measures from casino gaming firms that are publicly traded in the United States.¹ We study the casino gaming industry for several reasons. First, it contributes substantially to the national and regional economy. Gaming revenues in the U.S. were around \$115 billion in 2016, and are forecast to reach \$130 billion in 2019 (Lock, 2018). Second, there is a high level of idiosyncratic risk in the casino gaming industry; the role of casino gaming firms as quasi-financial firms raises the issue of whether their financial numbers can explain their stock values. Lastly, publicly listed casino gaming firms have long been classified as “sin” stocks whose activities are frowned upon and considered unethical or immoral; there is evidence of a consequent discounting of their share prices (Cheung & Lam, 2015). Thus, how the financial information of casino gaming firms is valued and trusted by financial markets may be different from the case of other firms.

Using data from casino gaming operators publicly listed in the United States from 1999 to 2017, we evaluate the usefulness of financial and non-financial information for market valuation and stock returns. Our financial variables include assets, liabilities, book value, earnings, accrual and cash flow from operations. As casino gaming revenues are generated from customer spending on table games and slot machines, we use the number of table games and slot machines as our major non-financial variables.

We find that financial measures, except for accrual numbers, have strong explanatory power for market valuation and market-adjusted returns in the casino gaming industry, which reflect a firm’s stock market performance compared to that of a benchmark index. Our findings are of interest to accounting researchers because, while confirming the validity of most financial variables, unlike prior accounting research (Rayburn, 1986; Dechow, 1994; Barth et al., 1999; Barth et al., 2001), we find that accounting accruals are not value relevant to market valuation and stock returns in the casino gaming industry. One possible explanation is that a large proportion of casino gaming revenues are generated directly from cash spending by customers, and accruals, such as receivables from gamblers, are significantly lower than in other industries and may be priced differently.

¹ As revenues of the U.S. gaming industry come largely from casinos, we use these terms interchangeably, with casino revenues representing substantially all gaming revenues, excluding the video game industry.

In terms of non-financial variables, we find that the number of slot machines and number of gaming tables, and the ratio between them, have significant power in explaining stock market values, incremental to financial information. Even after financial variables are incorporated, market valuations are higher for casino gaming firms with more table games, fewer slot machines, and a higher ratio of gaming tables to slot machines. Our results are reasonable based on our survey of the casino gaming literature; Thalheimer and Ali (2008) find that the addition of table games to the gaming mix can significantly increase revenue. Recent evidence from the media also suggests that casinos are rebalancing away from slots towards table games (Heim, 2015). However, slot machines have become increasingly important in generating gaming revenues. For example, Boylan (2016) suggests that technological developments have led to increased revenue and efficiency from slot machines, offsetting some “economic challenges” from table games. However, our non-financial variables are significant primarily in explaining market valuation, and are only weakly related to stock returns. Hence, these non-financial variables are better able to explain variation in long-term patterns, rather than variations in annual returns.

As the first study of the value relevance of financial and non-financial information in the casino gaming industry, this study makes several contributions. First, we contribute to literature in accounting by studying the importance of financial and non-financial measures to stock prices in the casino gaming industry. We find that financial information is generally value relevant while accrual measures are not. We also find that non-financial variables in the casino gaming industry are generally value relevant in explaining market valuation. Both results are new. Second, we provide insights for hospitality management based on our study of our non-financial variables and their relationships with the underlying gaming operations.

Literature Review

The Casino Gaming Industry in the United States

Several regulatory changes have led to significant developments in the casino gaming industry (Eadington, 1999). Nevada’s Corporate Gaming Act of 1969 allowed listed companies to hold gaming licenses for the first time. Subsequently, major hospitality firms such as Hilton, Holiday Inn, MGM, and Ramada entered the casino market. The period after 1988 saw a rapid expansion of casino gaming activities after the passing of the Indian Gaming Regulatory Act by Congress in 1988 (Eadington, 1999). Growth in the number of casinos and gaming opportunities has continued in recent years, including both online and land-based gaming (Huber, 2015). Commercial casinos now exist in 24 states (American Gaming Association, 2015) and Native American-operated casino gaming facilities now exist in 28 states. Industry estimates suggest that commercial casinos provide up to 350,000 jobs and have a wider economic impact of \$240 billion (American Gaming Association, 2016), illustrating the economic significance of the casino gaming industry.

Economic Costs and Benefits of the Casino Gaming Industry

Research has examined the economic benefits and costs of casino gaming development. First, in terms of benefits, casinos “yield positive economic benefits on net to [their] host economy” (Rose and Associates, 1998), including job creation (Regional Economics Applications Laboratory, 2003; Morse & Goss, 2007; Eadington, 1999), and increased government revenues through gaming taxes, which can be used for public services to benefit local citizens (Williams et al., 2011; Eadington, 1999). The economic costs associated with an increased number of casino gaming facilities include regulatory costs, infrastructural upgrades, and social costs (Williams et al., 2011). Regulatory costs are the cost of government oversight over gaming operations. Infrastructure costs relate

to infrastructure upgrades when new casino gaming facilities are introduced (e.g. public transportation, police and emergency services, roads, water services, sewage treatment). The most well-known social cost associated with casinos is the possibility of problematic gambling (addiction), which can lead to mental health issues, bankruptcy, and divorce, and related problems.

In the casino gaming industry, gaming revenues derive primarily from two sources: table games and slot machines. Overall, table games are likely to contribute more to total gaming revenues, as the value of bets placed at table games is much larger than at slot machines. For example, Siu and Eadington (2009) find that table games generate much higher revenue and profit per square foot utilization, compared to slot machines. They also find that table games generate a substantially higher proportion of revenue for casinos in Macau than in Europe and North America, providing evidence of international variations in sources of revenue generation. However, Boylan (2016) suggests that technological developments have led to significant increases in slot machine revenue-generation over time. Evidence also suggests that, to some degree, revenues from tables and slots are inversely related. Thalheimer and Ali (2008) find that revenue from slot machines increases with the number of slot machines, but decreases with the number of table games, based on a sample of 27 racinos and riverboat casinos in the Midwestern United States.

Researchers have also examined non-gaming revenues generated by casino gaming operators. Competition due to legalization of gambling and the increasing number of casinos in the U.S. means that non-gaming facilities are important as a source of revenue-generation. The prior literature on these non-gaming revenues suggests that the wider customer experience plays an important role in determining the revenues and profitability of hotel-casino resorts (Suh, 2011; Tanford & Suh, 2012). Anecdotal evidence from industry executives also suggests that senior managers view investment in these non-gaming facilities as important in attracting customers and increasing gaming revenues (Brinkerhoff-Jacobs, 2015).

Value Relevance of Financial and Non-Financial Information

A well-established body of research in the accounting literature has investigated the importance of both financial and non-financial information to stock market prices. This body of research measures the informativeness of accounting information concerning market value and returns, i.e. the explanatory power of financial statements (namely earnings, cash flows, and book value) for market prices. This helps investors assess the informativeness of financial statements in their investment decisions; the higher the value relevance, the more investors can rely on financial statements when making investment decisions (Francis & Schipper, 1999; Sami & Zhou, 2004). However, researchers have found mixed results on the stability of financial statement value relevance over time. Lev (1989) suggests that the quality of the information content matters to stock prices, and that the informativeness of financial statements declines with lower quality information. For example, accounting standards allow for some intangible assets, but the cost and value of these intangible assets cannot be fully recognized and measured by traditional reporting models (Lev & Zarowin, 1999).

Accounting standards in the U.S. impose a standardized set of rules on businesses, regardless of business model. As a result, the ability of accounting information to fully reflect a firm's condition is constrained. Thus, researchers have investigated the impact of non-financial measures on stock prices. Amir and Lev (1996) find that for firms in the wireless industry, including non-financial measures improves the informativeness of financial measures, suggesting that financial and non-financial information are complementary. Ittner and Larcker (1998) find that a customer satisfaction measure is useful in explaining financial performance and stock prices. Riley et al. (2003) find that several non-financial measures are value relevant for the airline industry, such as

load factor, available capacity, and market share. Hughes (2000) finds that air pollution measures are value relevant in explaining the market value of equity for electricity utility firms. Graham et al. (2001) find that non-financial measures of Internet usage, like unique users for service companies, and page views for e-retailers and content or community firms, are more value relevant than other non-financial variables. Singal (2012) suggests that consumer sentiment, i.e. confidence in the economy, affects stock returns in the hospitality industry.

Accounting and Financial Research in the Casino Gaming Industry

Accounting and financial research specific to the casino gaming industry is scarce and has largely concentrated on investment risk. In the decade before 2007, a significant growth trend in both revenue and stock price was observed in the casino industry, but right after 2007 revenue and stock price in the casino industry started to decline due to recession (Repetti & Kim, 2010). Using financial data on casino gaming operators from 1992–1994, Gu and Kim (1998) find that over 90% of investment risk in the casino gaming industry is unsystematic. Casino gaming stocks also have higher abnormal returns and variability than stocks of non-casino firms (Cheung & Lam, 2015), with IPOs that tend to underperform (Borghesi et al., 2015). Gu and Kim (1998) evaluate different financial ratios and find that only asset turnover ratio is significantly negatively related to beta, while other ratios have no statistically significant correlation. The findings of Repetti and Kim (2010) are somewhat consistent with those of Gu and Kim (1998). They find that the asset turnover ratio is significantly related to beta during times of recession. Repetti and Kim (2010) also find that liabilities as a percentage of assets are significantly positive during recession, suggesting that gaming companies are very sensitive to economic downturn. Thus, gaming firms need to be careful to manage their debts during recession, due to the associated financial risk. Repetti and Kim (2010) find that other financial ratios such as the quick ratio, return on assets, and EBIT growth rate are insignificant determinants of beta. We are not aware of any prior research on the informativeness of financial or non-financial information in the casino gaming industry, even though its “non-traditional” business model suggests that non-financial measures may be particularly informative to investors.

Research Design

Sample Selection

Our sample consists of all U.S.-listed firms in the Compustat database with returns data from CRSP, that reported gaming-related revenues for the period 1999 to 2017, the most recently available year at the time of data collection. We identify 38 casino gaming operators with the required data in Compustat. We delete four firms that are primarily manufacturers of slot machines, rather than gaming operators. A further 14 firms are missing returns data, resulting in a final sample of 20 firms for analysis of returns.² We delete firms with negative equity value, as they are not going concern operations, and winsorize outliers at the 1st and 99th percentiles. We apply a panel data approach and examine cross-sectional (subscript j) and time series data (subscript t), for the period from 1999, the first year for which industry-specific data for casino gaming firms are available, until 2017. Our final sample consists of 244 firm-years from 20 unique firms. Appendix A lists the 20 casino gaming firms and the number of years that each firm appears in our sample.

Hypothesis Development

The first objective of our study is to examine how established models of valuation apply to the casino gaming industry. In general, empirical evidence thus far from the accounting and finance literature has established significant relationships

² Non-financial measures for the casino gaming industry can be found on Compustat’s Capital IQ data set under “Industry-specific annual” data (S&P, 2008).

between financial information (positively with assets, earnings, book value of equity, accruals, and cash flows, and negatively with liabilities) and market valuation (Collins et al., 1997; Francis & Schipper, 1999; Landsman & Maydew, 2002). However, as noted earlier, researchers have also suggested that this simple characterization is not applicable to all industries, as specific industry characteristics may lead investors to rely differently on financial information, and on non-financial information to complement or contextualize financial information (Amir & Lev, 1996; Riley et al., 2003). Moreover, casino gaming firms may behave somewhat differently from other firms, as they have higher abnormal returns and higher idiosyncratic risk, which suggests that investors rely on more firm-specific information (Cheung & Lam, 2015). Here, we adopt a baseline analysis using financial variables from prior research (earnings, book value of equity, assets, liabilities, accruals, and cash flows), and predict that the market's use of *financial information* will behave in a manner similar to other industries, and that *all* of these variables are value relevant to equity prices and stock market returns. We predict positive relationships with earnings, book value of equity, assets, accruals, and cash flows, and a negative relationship with liabilities; our hypothesis is stated as follows:

H1: *Accounting information is value relevant to equity market values and stock market returns in the casino gaming industry.*

We then examine whether non-financial information provides incremental information content to markets in valuing casino gaming firms. Researchers including Amir and Lev (1996), Ittner and Larcker (1998), and Riley et al. (2003) find that non-financial information has additional explanatory power in predicting market values and returns, complementing financial information. Therefore, including non-financial information in a valuation model may be superior to using financial information alone. For casino gaming firms, our non-financial measures include the number of table games, number of slot machines, table game to slot machine ratio, and relative importance of each in the casino's operations. We expect non-financial information to be incrementally value relevant over financial information. However, we make no directional prediction for these variables. We develop our second hypothesis as follows:

H2: *Non-financial information is incrementally value relevant to market prices and stock returns in the casino gaming industry.*

Regression Models

To test H1, we adopt the model of Francis and Schipper (1999) and Sami and Zhou (2004) to measure the power of financial information to explain market values and stock returns. We estimate the following regression models to examine the explanatory power of assets and liabilities (Model 1A) and book value of equity and earnings (Model 2A) for market values, as follows:

Power of assets and liabilities to explain market value

$$MV_PS_{j,t} = \alpha_{0,t} + \alpha_{1,t} ASSET_PS_{j,t} + \alpha_{2,t} LIAB_PS_{j,t} \quad (1A)$$

Power of book value of equity and earnings to explain market value

$$MV_LBV_{j,t} = \beta_{0,t} + \beta_{1,t} BV_LBV_{j,t} + \beta_{2,t} EARN_LBV_{j,t} \quad (2A)$$

where $MV_PS_{j,t}$ is the market value per share for company j at the end of year t , $ASSET_PS_{j,t}$ and $LIAB_PS_{j,t}$ are the book value of assets and liabilities per share, respectively, $MV_LBV_{j,t}$ is the market value of equity, $BV_LBV_{j,t}$ is the book value of equity, and $EARN_LBV_{j,t}$ is earnings before extraordinary items. $MV_LBV_{j,t}$, $BV_LBV_{j,t}$, and $EARN_LBV_{j,t}$ are deflated by the book value of equity at the end of year $t-1$ (i.e. the lagged book value of equity). We expect a positive coefficient for $ASSET_PS_{j,t}$ and a negative coefficient for $LIAB_PS_{j,t}$, and positive coefficients for both $BV_LBV_{j,t}$ and $EARN_LBV_{j,t}$. Appendix B presents definitions of all variables.

To examine the explanatory power of earnings and changes in earnings (Model 3A) and accruals and cash flows (Model 4A) for stock returns,³ we estimate the following regression models:

Power of earnings and change in earnings to explain returns

$$RET_{j,t} = \varepsilon_{0,t} + \varepsilon_{1,t} \Delta EARN_LMV_{j,t} + \varepsilon_{2,t} EARN_LMV_{j,t} \quad (3A)$$

Power of accruals and cash flow to explain returns

$$RET_{j,t} = \pi_{0,t} + \pi_{1,t} ACCR_LMV_{j,t} + \pi_{2,t} CFO_LMV_{j,t} \quad (4A)$$

where $RET_{j,t}$ is the cumulative market-adjusted return for company j for the 12 months ending three months after the end of fiscal year,⁴ $\Delta EARN_LMV_{j,t}$ is the change in earnings before extraordinary items, and $EARN_LMV_{j,t}$ is the earnings before extraordinary items. Our accruals measure, $ACCR_LMV_{j,t}$, is defined as $(\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - DEP$, following Aboody et al. (2002), where ΔCA is the change in current assets, $\Delta Cash$ is the change in cash and cash equivalents, ΔCL is the change in current liabilities, ΔSTD is the change in debt included in current liabilities, ΔTP is the change in tax payable, and DEP is the depreciation and amortization expense. $CFO_LMV_{j,t}$ is defined as the cash flow from operating activities. LMV denotes variables deflated by the market value of equity at the end of year $t-1$ (lagged market value of equity). We expect positive coefficients on $\Delta EARN_LMV_{j,t}$, $EARN_LMV_{j,t}$, $ACCR_LMV_{j,t}$, and $CFO_LMV_{j,t}$.

The preceding models include only financial measures. To test H2, which focuses on the incremental relevance of non-financial measures, we estimate variations of the models adding non-financial variables specific to the casino gaming industry. First, to estimate market value per share, we add two non-financial measures: LogNSLOTS , the logarithmic (base 10) transformation of the number of slot machines, and LogNTABLES , the logarithmic (base 10) transformation of the number of table games. We specifically examine these two measures because casinos generate revenues directly from table games and slot machines. We extend Models 1A and 2A as follows:

Power of assets, liabilities, slot machines, and table games to explain market value

$$MV_PS_{j,t} = \alpha_{0,t} + \alpha_{1,t} ASSET_PS_{j,t} + \alpha_{2,t} LIAB_PS_{j,t} + \alpha_{3,t} \text{LogNSLOTS}_{j,t} + \alpha_{4,t} \text{LogNTABLES}_{j,t} \quad (1B)$$

Power of book value, earnings, slot machines, and table games to explain market value

$$MV_LBV_{j,t} = \beta_{0,t} + \beta_{1,t} BV_LBV_{j,t} + \beta_{2,t} EARN_LBV_{j,t} + \beta_{3,t} \text{LogNSLOTS}_{j,t} + \beta_{4,t} \text{LogNTABLES}_{j,t} \quad (2B)$$

We expect the coefficient signs of the financial variables in Models 1B and 2B to be consistent with those in Models 1A and 2A. As noted earlier, for the non-financial variables LogNTABLES and LogNSLOTS , we make no directional predictions, but expect the coefficients to be significant.

Similarly, when examining stock returns, we also modify the models to include non-financial variables as follows, and expect the coefficient of these variables to be

³ Market-adjusted returns refer to the raw stock market return of an individual firm, less the return of a benchmark index over the same period. In this paper, the cumulative abnormal return is calculated as the sum of a firm's daily market-adjusted stock return over the 12-month period, ending three months after the fiscal year-end.

⁴ We calculate our return ending three months after the fiscal year end following the method of Lam et al. (2013). This allows for the lag between the fiscal year end date and the release and filing of audited year-end financial statements, which must be filed within 60-90 days of the fiscal year-end (SEC, 2016), depending on the size of the issuer.

significant:

Power of earnings, change in earnings, slot machines, and table games to explain returns

$$RET_{j,t} = \varepsilon_{0,t} + \varepsilon_{1,t} \Delta EARN_LMV_{j,t} + \varepsilon_{2,t} EARN_LMV_{j,t} + \varepsilon_{3,t} \text{LogNSLOTS}_{j,t} + \varepsilon_{4,t} \text{LogNTABLES}_{j,t} \quad (3B)$$

Power of accruals, cash flow, slot machines, and table games to explain returns

$$RET_{j,t} = \pi_{0,t} + \pi_{1,t} ACCR_LMV_{j,t} + \pi_{2,t} CFO_LMV_{j,t} + \pi_{3,t} \text{LogNSLOTS}_{j,t} + \pi_{4,t} \text{LogNTABLES}_{j,t} \quad (4B)$$

Furthermore, to test for non-linear effects, we include the interaction term (LogNSLOTS \times LogNTABLES) of the number of table games and number of slot machines in Models 1–4, to form Models 1C–4C. In Models 1D–4D, we replace the log of the number of table games and the log of the number of slot machines with the ratio between them, TABLE_SLOT_RATIO, calculated as the number of gaming tables divided by the number of slot machines. In Models 1E–4E we add TABLE_SLOT_RATIO_SQ, which is the squared term of TABLE_SLOT_RATIO, to examine the potential nonlinear effect.

Empirical Results

Table 1 provides descriptive statistics for the financial, non-financial, and gaming variables used in our regression models. Our sample casino gaming operators have a mean market price of approximately \$21 per share, ranging from 75 cents to \$141.49. The mean value of assets and liabilities per share are \$30.83 and \$22.21, respectively, for a net positive asset value of approximately \$8 per share. Among the non-financial variables, the mean number of table games is 398 and the mean number of slot machines is 8,864. Firms in our sample have a minimum of 4 gaming tables and 191 slot machines. The mean value of the ratio of table games to slot machines (TABLE_SLOT_RATIO) is 4.921. That is, for every 100 slot machines, there are approximately 4.9 table games. Table 2 provides descriptive statistics of the number of slot machines and table games by year from 1999 to 2017.

Table 1
Descriptive Statistics

| Variable | N | Mean | Median | Std. Dev. | Min | Max |
|--------------------------------|-----|--------|--------|-----------|--------|---------|
| <i>Dependent variables</i> | | | | | | |
| MV_PS | 244 | 21.800 | 12.360 | 25.426 | 0.750 | 141.490 |
| MV_LBV | 244 | 4.449 | 2.161 | 10.879 | 0.234 | 109.945 |
| RET | 244 | 0.140 | 0.105 | 0.564 | -2.019 | 2.694 |
| <i>Independent variables</i> | | | | | | |
| ASSET_PS | 244 | 30.829 | 25.548 | 26.937 | 0.980 | 136.630 |
| LIAB_PS | 244 | 22.207 | 16.548 | 22.427 | 0.259 | 110.966 |
| BV_LBV | 244 | 1.292 | 1.072 | 2.012 | -1.223 | 21.285 |
| EARN_LBV | 244 | 0.328 | 0.232 | 0.849 | -2.311 | 6.082 |
| EARN_LMV | 244 | 0.168 | 0.110 | 0.264 | -0.589 | 2.114 |
| ΔEARN_LMV | 244 | 0.004 | -0.005 | 0.295 | -1.922 | 2.107 |
| ACCRUAL_LMV | 244 | 0.298 | 0.171 | 0.518 | -0.984 | 3.496 |
| CFO_LMV | 244 | 0.204 | 0.151 | 0.226 | -0.296 | 1.183 |
| <i>Non-financial variables</i> | | | | | | |
| NSLOTS | 244 | 8864.4 | 3500.0 | 9762.8 | 191.0 | 41136.0 |
| NTABLES | 244 | 398.1 | 92.5 | 569.8 | 4.0 | 2735.0 |
| LogNSLOTS | 244 | 3.655 | 3.544 | 0.547 | 2.281 | 4.614 |
| LogNTABLES | 244 | 2.122 | 1.966 | 0.714 | 0.602 | 3.437 |
| TABLE_SLOT_RATIO | 244 | 4.921 | 2.552 | 6.203 | 0.324 | 29.507 |
| TABLE_SLOT_RATIO_SQ | 244 | 62.541 | 6.511 | 153.431 | 0.105 | 870.655 |

Table 2
Descriptive Statistics of NSLOTS and NTABLES by Year

| Year | NSLOTS | | | NTABLES | | |
|------|--------|------|--------|---------|-----|-------|
| | Mean | Min | Max | Mean | Min | Max |
| 1999 | 4,960 | 608 | 17,136 | 147 | 8 | 539 |
| 2000 | 7,325 | 858 | 28,546 | 232 | 15 | 1,135 |
| 2001 | 7,577 | 1050 | 28,779 | 220 | 11 | 1,120 |
| 2002 | 8,484 | 1099 | 25,928 | 234 | 11 | 1,017 |
| 2003 | 8,309 | 1103 | 26,439 | 229 | 11 | 1,101 |
| 2004 | 8,529 | 1186 | 24,809 | 234 | 7 | 1,050 |
| 2005 | 9,229 | 1158 | 39,175 | 308 | 7 | 1,638 |
| 2006 | 8,955 | 195 | 41,136 | 330 | 4 | 1,761 |
| 2007 | 8,187 | 195 | 36,686 | 367 | 4 | 1,956 |
| 2008 | 8,762 | 195 | 35,735 | 377 | 4 | 1,928 |
| 2009 | 8,921 | 195 | 34,966 | 376 | 4 | 1,985 |
| 2010 | 8,596 | 191 | 30,465 | 437 | 4 | 2,070 |
| 2011 | 8,747 | 191 | 29,673 | 449 | 4 | 2,080 |
| 2012 | 9,569 | 718 | 33,115 | 475 | 15 | 1,830 |
| 2013 | 10,391 | 558 | 37,083 | 585 | 10 | 2,380 |
| 2014 | 10,398 | 577 | 37,083 | 627 | 15 | 2,530 |
| 2015 | 10,260 | 718 | 37,083 | 630 | 30 | 2,542 |
| 2016 | 9,189 | 1070 | 31,006 | 610 | 25 | 2,735 |
| 2017 | 9,333 | 1133 | 24,460 | 904 | 52 | 1,699 |

A table matrix of correlation coefficients between key regression variables is provided in the Online Appendix, which is available upon request to the corresponding author. The top and bottom diagonal provide Spearman and Pearson correlation coefficients, respectively. In the discussion that follows, we refer to Pearson correlations for continuous variables and Spearman correlations for discrete variables. First, the correlations among the market valuation variables (MV_PS, MV_LBV, ASSET_PS, LIAB_PS, BV_LBV, EARN_LBV, EARN_LMV, ACCRUAL_LMV, and CFO_LMV) are generally highly significant and positive. Second, among the variables in the returns models, the correlations between annual returns (RET) and financial variables are often not significant. This suggests that our financial variables may be more capable of explaining market valuation than of explaining stock returns. Third, for non-financial variables, both LogNTABLES and LogNSLOTS are positively correlated, and are significantly and positively correlated with MV_PS, ASSET_PS, LIAB_PS, EARN_LBV, and Δ EARN_LMV. However, while TABLE_SLOT_RATIO is significantly and positively correlated with MV_PS, it is negatively correlated with EARN_LMV, Δ EARN_LMV and ACCRUAL_LMV. We note that the non-financial variables, LogNTABLES, LogNSLOTS, and TABLE_SLOT_RATIO, are highly correlated with each other (correlations from .52 to .81). All of the correlations are reasonable and consistent with those in the literature. In the design of our regression analysis, we gauge the effect of multicollinearity, which may lead to the wrong sign or wide swings in parameter estimates (Greene, 1993). For this reason, we estimate the effect of TABLE_SLOT_RATIO separately from LogNTABLES and LogNSLOTS.

Table 3
Value Relevance of Financial Information (MV_PS)

| Variable | MV_PS (1A) | MV_PS (1B) | MV_PS (1C) | MV_PS (1D) | MV_PS (1E) |
|--------------------------|-----------------------|------------------------|-----------------------|-----------------------|-----------------------|
| Intercept | -0.8641 (-0.20) | 55.3657*** (3.51) | 33.2854 (1.38) | -8.6675** (-2.13) | -3.4976 (-0.78) |
| ASSET_PS | 1.2337*** (7.62) | 1.3919*** (8.56) | 1.3937*** (8.58) | 1.3375*** (8.59) | 1.3370*** (8.750) |
| LIAB_PS | -0.7451*** (-4.03) | -0.8792*** (-4.81) | -0.8607*** (-4.70) | -0.8934*** (-5.03) | -0.8943*** (-5.10) |
| LogNSLOTS | | -22.4915*** (-3.64) | -14.9489* (-1.71) | | |
| LogNTABLES | | 11.0083** (2.49) | 21.4507** (2.20) | | |
| LogNSLOTS × LogNTABLES | | | -3.4904 (-1.21) | | |
| TABLE_SLOT_RATIO | | | | 1.5278*** (5.10) | -0.3327 (-0.45) |
| TABLE_SLOT_RATIO_SQ | | | | | 0.0668*** (2.77) |
| Number of Cross Sections | 20 | 20 | 20 | 20 | 20 |
| Time Series Length | 19 | 19 | 19 | 19 | 19 |
| N | 244 | 244 | 244 | 244 | 244 |
| Firm Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| R ² | .3738 | .4061 | .4008 | .4321 | .4487 |

Note: The dependent variable is MV_PS. *** p < .01, ** p < .05, * p < .10.

Regression Results: Financial and Non-Financial Variables

Table 3 reports the coefficients and t -statistics of regressions estimating the relationship between financial information and share prices. Results from Model 1A show a positive and significant relationship between ASSET_PS and MV_PS (coefficient = 1.2337, $t = 7.62$), and a negative and significant relationship between LIAB_PS and MV_PS (coefficient = -0.7451 , $t = -4.03$), consistent with relationships established in prior accounting research, which has found that assets are valued positively and liabilities negatively. Our results here indicate that in terms of assets and liabilities, the pricing behavior of investors for casino gaming firms is consistent with behavior observed for firms in other industries. In Model 1B, where we add LogNTABLES and LogNSLOTS to examine the incremental explanatory power of non-financial variables for market values, the coefficient to LogNSLOTS is negative and significant (coefficient = -22.4915 ; $t = -3.64$), while the coefficient to LogNTABLES is positive and significant (coefficient = 11.0083; $t = 2.49$). These results are interesting and surprising. The stock market seems to significantly positively value table games, but significantly negatively value slot machines. In this section, we document our empirical results; in later sections of this paper, we conjecture about the possible reasons for these valuations. In Model 1C, the coefficient of LogNSLOTS \times LogNTABLES is not significant, suggesting that their effects are separate from each other. In Models 1D and 1E, the coefficients of TABLE_SLOT_RATIO (coefficient = 1.5278; $t = 5.10$) and TABLE_SLOT_RATIO_SQ (coefficient = .0668; $t = 2.77$) are both positive and highly significant, with results of Model 1E showing that the effect is non-linear.

In Table 4, Model 2A, both earnings and book value of equity are positively priced in market values, with BV_LBV (coefficient = 4.3693; $t = 26.22$) and EARN_LBV (coefficient = 1.3318; $t = 3.01$) both positive and significant, consistent with results from prior literature. In Models 2B and 2C, the coefficients of LogNSLOTS and LogNTABLES and their interaction term are insignificant. In Model 2D, the coefficient of TABLE_SLOT_RATIO (coefficient = .1734; $t = 2.00$) is positive and significant. This suggests that rather than the individual numbers of slots and tables, it is the relative proportion of the two that is relevant for market values. When adding the square term, however, neither is significant.

Table 4
Value Relevance of Financial Information (MV_LBV)

| Variable | <i>MV_LBV</i> (2A) | <i>MV_LBV</i> (2B) | <i>MV_LBV</i> (2C) | <i>MV_LBV</i> (2D) | <i>MV_LBV</i> (2E) |
|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Intercept | -1.3586* (-1.69) | 1.0130 (0.22) | -2.7036 (-0.33) | -2.2704*** (-2.64) | -1.5628 (-1.45) |
| BV_LBV | 4.3693*** (26.22) | 4.3684*** (25.63) | 4.3591*** (25.35) | 4.3659*** (26.16) | 4.3889*** (26.16) |
| EARN_LBV | 1.3318*** (3.01) | 1.2831*** (2.89) | 1.2742*** (2.86) | 1.2321*** (2.81) | 1.2357*** (2.80) |
| LogNSLOTS | | -1.5300 (-0.84) | -0.3525 (-0.13) | | |
| LogNTABLES | | 1.4976 (1.12) | 3.3331 (0.92) | | |
| LogNSLOTS × LogNTABLES | | | -0.5541 (-0.55) | | |
| TABLE_SLOT_RATIO | | | | 0.1734** (2.00) | 0.1159 (0.44) |
| TABLE_SLOT_RATIO_SQ | | | | | 0.0112 (1.17) |
| Number of Cross Sections | 20 | 20 | 20 | 20 | 20 |
| Time Series Length | 19 | 19 | 19 | 19 | 19 |
| N | 244 | 244 | 244 | 244 | 244 |
| Firm Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| R ² | .7685 | .7684 | .7686 | .7700 | .7719 |

Note: The dependent variable is MV_LBV. *** p < .01, ** p < .05, * p < .10.

In Table 5, Model 3A, while earnings, EARN_LMV, is positively related to returns (coefficient = .3574; $t = 2.52$), change in earnings, Δ EARN_LMV, is negative and is not significant (coefficient = -0.1428 ; $t = -1.15$). While this finding about earnings is consistent with prior research, the insignificance of change in earnings differs from prior research on the general market (Burgstahler & Dichev, 1997; Collins et al., 1997), which suggests that either Δ EARN_LMV or market pricing have different characteristics in the casino gaming industry than in other industries. Gu and Kim (1998) find that casino gaming firms are riskier than firms in other industries, and Cheung and Lam (2015) find higher variability in stock returns of casino gaming firms. As a result, fluctuations in their earnings are much less controllable by management effort and are more likely to be affected by uncontrollable variations. When both EARN_LMV and Δ EARN_LMV are evaluated together with other non-financial variables, none of the non-financial variables are significant. In Model 3E, there is weak evidence that the TABLE_SLOT_RATIO is positive. The general lack of significance of the number of tables and slots may be partly explained by their relative stickiness. Since they are stock-based measures that generally do not change significantly from year to year unless companies open or close properties, it is logical that they have less impact on change in earnings, which are changes in a flow measure.

Table 5
Value Relevance of Financial Information (RET)

| Variable | RET (3A) | RET (3B) | RET (3C) | RET (3D) | RET (3E) |
|---------------------------|---------------------|--------------------|--------------------|---------------------|---------------------|
| Intercept | 0.0943 (1.19) | 0.2189 (0.86) | 0.3365 (0.59) | 0.0535 (0.65) | -0.0108 (-0.12) |
| EARN_LMV | 0.3574*** (2.52) | 0.3621** (2.43) | 0.3675** (2.43) | 0.3847*** (2.70) | 0.3957*** (2.78) |
| ΔEARN_LMV | -0.1428 (-1.15) | -0.1399 (-1.11) | -0.1426 (-1.12) | -0.1506 (-1.21) | -0.1559 (-1.26) |
| LogNSLOTS | | -0.1040 (-1.06) | -0.1384 (-0.77) | | |
| LogNTABLES | | 0.1202 (1.63) | 0.0617 (0.23) | | |
| LogNSLOTS × LogNTABLES | | | 0.0163 (0.23) | | |
| TABLE_SLOT_RATIO | | | | 0.0073 (1.47) | 0.0035* (1.81) |
| TABLE_SLOT_RATIO_SQ | | | | | -0.0011 (-1.48) |
| Number of Cross Sections | 20 | 20 | 20 | 20 | 20 |
| Time Series Length | 19 | 19 | 19 | 19 | 19 |
| N | 244 | 244 | 244 | 244 | 244 |
| Firm Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| R ² | .0260 | .0375 | .0377 | .0349 | .0436 |

Note: The dependent variable is RET. *** p < .01, ** p < .05, * p < .1.

In Table 6, Model 4A, cash flows, CFO_LMV, is significantly positive (coefficient = .4041; $t = 2.89$) while accruals, ACCR_LMV, is not significant (coefficient = -0.0692 ; $t = -1.14$) in explaining returns. These results are likely due to the nature of casino gaming revenues, a large proportion of which is generated from cash bets, and the relatively lower importance of accounting accruals to casino gaming firms compared to firms in other industries. Our untabulated data show that accruals in our sample are on average significantly closer to zero than industrial firms examined in large-sample studies (Ball et al., 2016). Anecdotal evidence also points to the possibility of uncertainty over collection of receivables, which may affect the pricing.⁵ Our finding differs from the results established in prior accounting research, which has found that investors do account for accruals in their pricing decisions. When both ACCRUAL_LMV and CFO_LMV are evaluated with other non-financial variables, none of these non-financial variables is significant.

⁵ Recent reports in the media highlight cases where casinos have resorted to legal action to recover debts from customers, for example The Sands' attempt to recover \$12 million in Singapore (Source: Hollingsworth, J. (2017, May 31). Why Singapore casinos can't collect from China's high rollers? South China Morning Post. Retrieved from <https://www.scmp.com/news/china/diplomacy-defence/article/2096328/why-singapore-casinos-cant-collect-chinas-high-rollers>) and \$6.4 million in Las Vegas (Source: Schectman, J., & Koh, G. Q. (2016, September 30). Vegas casino's attempt to collect a debt exposes world of Chinese high-rollers. *Reuters*. Retrieved from <http://www.reuters.com/investigates/special-report/usa-vegas-shell/>).

Table 6
Value Relevance of Financial Information (RET)

| Variable | RET (4A) | RET (4B) | RET (4C) | RET (4D) | RET (4F) |
|---------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Intercept | 0.0927 (1.14) | 0.1691 (0.68) | 0.3387 (0.60) | 0.0601 (0.71) | 0.0083 (0.09) |
| ACCRUAL_LMV | -0.0692 (-1.14) | -0.0597 (-0.97) | -0.0614 (-0.99) | -0.0595 (-0.97) | -0.0577 (-0.94) |
| CFO_LMV | 0.4041*** (2.89) | 0.3900*** (2.72) | 0.3972*** (2.73) | 0.4120*** (2.94) | 0.4071*** (2.91) |
| LogNSLOTS | | -0.0786 (-0.83) | -0.1278 (-0.72) | | |
| LogNTABLES | | 0.0995 (1.36) | 0.0144 (0.05) | | |
| LogNSLOTS × LogNTABLES | | | 0.0236 (0.33) | | |
| TABLE_SLOT_RATIO | | | | 0.0057 (1.14) | 0.0286 (1.51) |
| TABLE_SLOT_RATIO_SQ | | | | | -0.0010 (-1.25) |
| Number of Cross Sections | 20 | 20 | 20 | 20 | 20 |
| Time Series Length | 19 | 19 | 19 | 19 | 19 |
| N | 244 | 244 | 244 | 244 | 244 |
| Firm Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| R ² | .0369 | .0450 | .0454 | .0422 | .0482 |

Note: The dependent variable is RET. *** p < .01, ** p < .05, * p < .10.

Discussion and Additional Analysis

Discussion

Our main results document that financial information released by gaming firms is value relevant, in that investors can use the accounting information contained in financial statements to assist in investment and valuation decisions. However, we also find that the capital market places a higher market premium on casino operations with more table games than those with more slot machines. The capital market also places a premium on those firms with a higher table to slot ratio (or its variant). Note that the results hold strongly for MV_PS, market price per share, when LogNTABLES is significantly positive and LogNSLOTS is significantly negative and TABLE_SLOT_RATIO and TABLE_SLOT_RATIO_SQ are also significantly positive. Interestingly, the result for MV_LBV also shows that investors prefer casino operations with a higher table-to-slot ratio. MV_LBV is a variation of price-to-book-ratio, which reflects the capital market's expectation of growth in the firm's earnings (Subramanyam, 2014). Hence, our results imply that investors have expectation that casinos with a high table-to-slot ratio (or its variant) will have better growth potential.

Are our results reasonable? Why does the stock market seem to value table games more than slots? Accounting standards do not mandate disclosure of segmented information on table or slot machine revenues, and as a result most firms disclose only aggregate revenues. Thus, we have to infer their respective contribution by econometric method, regressing gaming revenues and margins on the numbers of slots and table

games.⁶ Using the 239 firm-years for which we have complete revenue and margin data, we estimate the regression equation in the form of $Revenue = f(NSLOTS, NTABLES)$, where *Revenue* is either gaming or non-gaming revenues, and gaming or total margin. Gaming revenue refers to the net difference between casino wins and losses, and non-gaming revenue refers to revenue from sources other than betting (e.g. revenues from hotels, restaurants, and other facilities). We run our estimation for each of the four dependent variables on our full sample, and for the sample partitioned between firms with and without international operations, and report the results of 12 estimation models in Table 8. For brevity, we present results for models with no intercept term, but models with the intercept term provide highly similar results.

In Table 7, our results show that for the overall sample, each gaming table is associated with gaming revenues of \$3.37 million and non-gaming revenues of \$0.47 million per year. However, each slot machine is associated with gaming revenues of -\$0.02 million and non-gaming revenues of \$0.0005 million per year. Our results indicate that, in relation to overall gaming revenue, firms incur a loss on slot machines, but table games are highly profitable. The negative revenue for slots may be due to the definition of gaming revenue as the difference between wins and losses. It is possible that casinos use slot machines to attract more customers, and thus accept lower odds in favour of the house. A larger crowd can bring in more customers who will both play table games and spend money on non-gaming products and services. Our results also show that both gaming margins are higher for tables than for slots. The total margin per gaming table is significantly higher than per slot machine (\$1.57 million vs. -\$0.0029 million). Thus, slots have a negative total margin in the overall sample.

⁶ We are grateful for the suggestion by an anonymous reviewer on the use of this method. Accounting standards, such as the United States FASB's Statement of Accounting Standard No. 14 (superseded by Accounting Standards Codification 280), or the relevant international accounting standard IFRS 8 Operating Segments, do not require firms to disclose information about their business segments, out of concern that such disclosures will leak proprietary information and harm a firm's competitive advantage. Our survey of annual reports of our sample firms finds that almost no firms disclose specific information on table and slot revenues (with the exception of Wynn, in some years).

Table 7
Analysis of Revenues and Margins between Gaming Tables and Slot Machines

| Sample | Independent variables | Dependent variable | | | |
|--|-----------------------|--------------------|---------------------|---------------|--------------|
| | | Gaming revenues | Non-gaming revenues | Gaming margin | Total margin |
| Full sample (\$m, overall) | per Table | 3.3703 *** | 0.4657 *** | 1.2933 *** | 1.5674 *** |
| | per Slot | -0.0212 *** | 0.0005 *** | 0.0011 | -0.0029 |
| | N firm-years | 239 | 239 | 239 | 239 |
| Firms with international operations (\$m) | per Table | 3.9295 *** | 0.2586 *** | 1.5419 *** | 1.7740 *** |
| | per Slot | -0.0475 ** | 0.0311 ** | -0.0124 | -0.0147 |
| | N firm-years | 65 | 65 | 65 | 65 |
| Firms with no international operations (\$m) | per Table | 0.4750 *** | 0.6659 *** | 0.1056 | 0.6057 *** |
| | per Slot | 0.0673 *** | -0.0046 *** | 0.0378 *** | 0.0269 *** |
| | N firm-years | 174 | 174 | 174 | 174 |

Note: Figures are expressed in millions of US dollars per year. *** p < .01, ** p < .05, * p < .1.

To gain more insights into these results, we further partition the sample between casino gaming firms with international operations and those without.⁷ We gather information on international operations based on data extracted from the Compustat segment database and from the firm's SEC filings. For firms with international operations, the pattern is similar to the overall sample. For firms without international operations, the pattern is quite different. Both table games and slot machines generate positive gaming revenues. Hence, for firms that concentrate on domestic operations, slots bring in positive gaming revenues and margins.

⁷ Again, because accounting standards do not mandate disclosure of geographic segmentation (e.g. firms may disclose other segment information such as product line information), we need to make a judgement on the extent of a firm's internationalization. We classify Century Casinos, Melco, and Wynn as having international operations throughout our entire sample period. Las Vegas Sands (from 2004), MGM (from 2010), and Isle of Capri (from 2008) have international operations for only part of the sample time frame. None of the other firms in our sample have international operations. We also collected the percentage of international operation data for use in our additional analysis.

Table 8
Aggregate Contribution of Tables and Slots using Sample Medians

| Sample | Independent Variables | Median N | Aggregate contribution of firms in the sample using the median number of tables and slots (\$m) | | | | | | | |
|--|-----------------------|----------|---|---------------------|---------------|--------------|--------|--------|----------|--------|
| | | | Gaming revenues | Non-gaming revenues | Gaming margin | Total margin | | | | |
| Firms with international operations (\$m) | Tables | 580 | 2,279.11 | 107.6% | 149.99 | 58.7% | 894.30 | 105.0% | 1,028.93 | 105.1% |
| | Slots | 3,393 | -161.00 | -7.6% | 105.52 | 41.3% | -42.21 | -5.0% | -49.71 | -5.1% |
| | Total | | 2,118.11 | | 255.51 | | 852.09 | | 979.22 | |
| | N firm-years | | 65 | | 65 | | 65 | | 65 | |
| Firms with no international operations (\$m) | Tables | 61 | 28.98 | 10.9% | 40.62 | 166.6% | 6.44 | 4.6% | 36.95 | 28.2% |
| | Slots | 3,500 | 235.69 | 89.1% | -16.24 | -66.6% | 132.16 | 95.4% | 93.98 | 71.8% |
| | Total | | 264.67 | | 24.38 | | 138.60 | | 130.92 | |
| | N firm-years | | 174 | | 174 | | 174 | | 174 | |

Note: The aggregate contribution per casino per year is calculated by multiplying the per-table and per-slot machine contributions by the average number of tables (398) and slots (8,864), as shown in Table 1. Our per-table and per-slot machine contribution figures are derived from the regression coefficients in Table 7.

In Table 8, we estimate the overall impact of slot machines and table games on a firm's annual financial results. We compute the total impact by multiplying the contribution per table and per slot machine (as shown in Table 7) by the median number of tables and slots in the sample of firms with international operations, and the sample of firms without international operations.⁸ For firms with international operations, table games provide substantially all gaming revenues and margins, while slots incur losses. However, for firms without international operations, both slots and tables generate positive gaming revenues and margins. Moreover, in these firms, gaming revenues and margins from slots are more important than those generated from tables. These indicate the different importance of slots for firms with international operations and those with purely domestic operations, and suggest that they may use different pricing and marketing strategies. For firms with international operations, gaming tables are much important, while for firms targeting domestic customers, slots are as important as table games, if not more so.

On the whole, our results are consistent with earlier findings that table games generate much higher revenue and profit (Siu & Eadington, 2009; Thalheimer & Ali, 2008). Our results also support the notion that a firm's optimal table-slot combination depends on its access to clientele. Firms without access to international markets may have fewer customers interested in table games and more customers interested in slot machines. However, the significant and positive correlation between the number of slots and tables (Table 3) suggests that these game types complement rather than counteract each other.

Table 9
Two-stage Regressions of Market Values and Returns on the Table–Slot Ratio

| Panel A: First-stage model of TABLE_SLOT_RATIO | |
|--|-----------------------|
| Variable | TABLE_SLOT_RATIO |
| Intercept | 2.4821 (1.29) |
| LDIST_AIRP | -4.6249*** (-6.22) |
| LSTATE_GDP | 2.0881*** (3.53) |
| LAS_VEGAS | 0.6179 (0.98) |
| INT_OPS | 8.6437*** (14.16) |
| N | 244 |
| R ² | .5468 |

⁸ For the overall sample, the median number of table games is 92.5 and the median number of slot machines is 3,500. For casino gaming firms with international operations and no international operations, the median figures are 580 and 3,393, and 61 and 3,500, respectively.

| Panel B: Second-stage models of MV_PS, MV_LBV, and RET | | | | |
|--|---------------------------|-----------------------|---------------------|---------------------|
| Variable | MV_PS (1) | MV_LBV (2) | RET (3) | RET (4) |
| Intercept | -2.8847 (-1.54) | -2.5656*** (-4.56) | -0.0411 (-0.62) | -0.0779 (-1.12) |
| ASSET_PS | 1.7165*** (12.24) | | | |
| LIAB_PS | -1.4946* ** (-8.92) | | | |
| BV_LBV | | 4.5288*** (25.02) | | |
| EARN_LBV | | 0.7381* (1.72) | | |
| EARN_LMV | | | 0.6543*** (3.92) | |
| ΔEARN_LMV | | | -0.2007 (-1.40) | |
| ACCRUAL_LMV | | | | 0.0251 (0.36) |
| CFO_LMV | | | | 0.7273*** (4.52) |
| TABLE_SLOT_RATIO | 1.0069*** (4.37) | 0.1869** (2.39) | 0.01454* (1.78) | 0.0125 (1.58) |
| N | 244 | 244 | 244 | 244 |
| R ² | .5564 | .7486 | .05197 | .0708 |
| Hausman's m-statistic | 8.77* | 1.05 | 2.80 | 4.65 |
| (p-value) | .0671 | .9015 | .5923 | .3247 |

Note: *** p < .01, ** p < .05, * p < .10.

Robustness Checks

We perform several sensitivity tests to assess the robustness of our results. First, there is a possibility that the number of slot machines and number of tables, and the resulting TABLE_SLOT_RATIO, are affected by the company's financial market performance, while our analysis models market value as a dependent variable. To address the concern about the potential endogeneity of the number of slots and tables, we perform two-stage least square analyses (2SLS) by regressing the number of tables and slots and the TABLE_SLOT_RATIO on a set of instrumental variables. The instrumental variables that we choose include i) distance of the casino from the nearest airport (LDIST_AIRP) in miles, ii) the GDP of the state where the headquarters of the casino is located (LSTATE_GDP); iii) an indicator variable for whether the casino has its headquarters in Las Vegas (LAS_VEGAS), and iv) an indicator variable for whether the firm has international operations (INTL_OPS).⁹ We do not use other financial or non-financial variables of

⁹ For ii) and iii) we use the headquarters state, as listed in Compustat, as the headquarters is likely to be in the same state as some of the company's key operations (such as Nevada), and also allows for more regional operations, such as Churchill Downs (Kentucky). We need to identify one location for our instrument, because firms do not disclose their revenue breakdown by state. Only one firm listed its main headquarters as outside the United States (Melco Crown Entertainment Ltd). For this case, we used a composite measure of the GDP of Hong Kong, Shenzhen, Macau, and the Greater Guangdong area, the source of most of its customers, in billions of US dollars, for 2010.

the company as instruments, because they may be determined endogenously with our dependent variables. We use LDIST_AIRP and LAS_VEGAS because location decisions are likely to affect the clientele attracted, while LSTATE_GDP may influence the type and budget of customers. INTL_OPS captures the differences between local and non-local customers. These instrumental variables are significantly correlated with LogNSLOTS, LogNTABLES, and TABLE_SLOT_RATIO (with correlation coefficients ranging from $-.34$ to $.65$) and they are on *a priori* grounds independent of the disturbance terms of the regression equations, as they were likely determined when the firm first set up its operations, or well before the current period. Table 9 reports the results of specifications in which TABLE_SLOT_RATIO is the endogenous variable.¹⁰ It is interesting to note that TABLE_SLOT_RATIO is now also marginally significant for Model 3. Hausman's test, however, shows that only the regression relating to MV_PS (Model 1) has a significant endogeneity issue.

A second potential concern is that an important variable may have been omitted from the regression. For instance, given that firms with international operations have more table games, is it the firm's international operations, rather than the number of table games and slots, that cause the valuation difference? We present the results of sensitivity analysis after adding measures of international operations in Table 10. We use two measures: 1) INT_OP, a dummy variable with a value of one for firms with international operations, and zero otherwise, and 2) INT_DEEP, a ratio measuring the proportion of total revenue derived from international operations (calculated as the revenue of international operations divided by the sum of domestic and international revenues). For conciseness, we present only the results using the TABLE_SLOT_RATIO variable, but models using the independent variables (LogNSLOTS, LogNTABLES) provide identical qualitative results. As shown in Table 10, the two international operations variables, INT_OP and INT_DEEP are not significant. Furthermore, casino size may be correlated to the number of tables and slots and firm size, and therefore also to market values. We thus perform further tests including measures of casino space. Our untabulated results are qualitatively similar to our main results. Overall, our robustness checks provide results consistent with what we presented earlier, and suggest that the variables we use in our main analyses subsume the effects of the international operations and size variables.

Conclusion

In this study, we examine the value relevance of both financial and non-financial information to market valuation and stock returns. We explore two research questions. First, we examine the value relevance of financial information in the casino gaming industry, and second, we examine the incremental explanatory power of non-financial information for market value and market-adjusted returns.

¹⁰ For conciseness, we only provide the results for TABLE_SLOT_RATIO. We also estimate specifications with both LogNSLOTS and LogNTABLES as endogenous variables and can provide these results upon request.

Table 10
Sensitivity Analysis Adding Measures of Internationalization

| Variable | MV_PS | MV_LBV | RET | RET |
|--------------------------|-----------------------|----------------------|----------------------|---------------------|
| Intercept | -8.5920 (-2.06)** | -2.3058 (-2.46)** | -2.3051 (-2.79)** | 0.0514 (0.63) |
| ASSET_PS | 1.3383 (8.57)*** | 4.3448 (26.19)*** | 4.3646 (26.02)*** | 0.3975 (2.75)*** |
| LIAB_PS | -0.8961 (-5.03)*** | 1.2639 (2.88)*** | 1.1265 (2.53)*** | -0.153 (-1.23) |
| TABLE_SLOT_RATIO | 1.5334 (4.94)*** | 0.1301 (1.27) | 0.2486 (2.05)** | 0.0036 (0.42) |
| INT_OP | -0.2396 (-0.06) | 1.2265 (0.91) | 0.0399 (0.44) | 0.0271 (0.31) |
| INT_DEEP | 0.8493 (0.12) | -2.0922 (-0.85) | 0.09342 (0.55) | 0.0044 (0.69) |
| R ² | .4323 | .7728 | .7728 | .0427 |
| Number of Cross Sections | 20 | | | |
| Time Series Length | 19 | | | |
| Number of Observations | 244 | | | |
| Firm Fixed Effects | Yes | | | |
| Year Fixed Effects | Yes | | | |

Note: *** p < .01, ** p < .05, * p < .10.

Consistent with findings from prior literature, financial information such as assets, liabilities, earnings, book value, and cash flow from operations are value relevant in the casino gaming industry. However, unlike prior literature, we find that accounting accruals are not value relevant in this industry. This may be due to the relatively lower proportion of accruals generated in the casino gaming industry compared to other industries. In terms of non-financial information, we find that the number of table games and the ratio of table games to slot machines help to explain market valuation.

To our knowledge, this is the first study to examine the value relevance of financial and non-financial information in the U.S. casino gaming industry. Our findings are beneficial not only to hospitality and accounting researchers, but they are also of interest to casino gaming operators and investors in hospitality firms. There are a few limitations to our study. First, our access to relevant data allows us only two primary non-financial variables; we have limited data on other potentially informative non-financial items. Second, we focus on listed U.S. casino gaming firms that provide data from 1999 to 2017. Some firms do not appear in all years, or are missing financial, non-financial, or stock market return data required for our estimations, and therefore we have a relatively small sample size. Further studies could expand the sample size to include international casino gaming firms and explore other non-financial variables.

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Appendix A

List of Firms and the Number of Observations

| | Name of Firm | Beginning Year | Ending Year | Total Firm-Year Observations |
|----|---|----------------|-------------|------------------------------|
| 1 | Ameristar Casinos Inc. | 1999 | 2011 | 13 |
| 2 | Boyd Gaming Corp | 1999 | 2016 | 18 |
| 3 | Caesars Entertainment Corp | 2013 | 2016 | 2 |
| 4 | Century Casinos, Inc. | 1999 | 2016 | 18 |
| 5 | Churchill Downs Inc. | 1999 | 2016 | 18 |
| 6 | Dover Downs Gaming & Entertainment Inc. | 2003 | 2016 | 14 |
| 7 | Eldorado Resorts Inc. | 2015 | 2016 | 2 |
| 8 | Empire Resorts Inc. | 1999 | 2016 | 12 |
| 9 | Full House Resorts, Inc. | 2007 | 2016 | 10 |
| 10 | Golden Entertainment Inc. | 2013 | 2016 | 4 |
| 11 | Isle of Capri Casinos Inc. | 1999 | 2015 | 17 |
| 12 | Las Vegas Sands Corp | 2005 | 2016 | 12 |
| 13 | MGM Resorts International | 1999 | 2017 | 19 |
| 14 | MTR Gaming Group Inc. | 1999 | 2012 | 14 |
| 15 | Melco Crown Entertainment Ltd | 2007 | 2017 | 11 |
| 16 | Monarch Casino & Resort, Inc. | 1999 | 2017 | 19 |
| 17 | Nevada Gold & Casinos Inc. | 2006 | 2017 | 12 |
| 18 | Penn National Gaming Inc. | 1999 | 2015 | 17 |
| 19 | Riviera Holdings Corp | 1999 | 2002 | 4 |
| 20 | Wynn Resorts Ltd | 2005 | 2012 | 8 |
| | Total Firm-Year Observations | | | 244 |

Appendix B

Variable Definitions

| Variable | Description |
|--|---|
| <i>Dependent variables</i> | |
| MV_PS | Market value of the company's equity per share at the end of the fiscal year. |
| MV_LBV | Market value deflated by book value at the end of the previous fiscal year. |
| RET | 12-month cumulative market adjusted returns ending 3 months after the end of the fiscal year. |
| <i>Independent variables – Financial</i> | |
| ASSET_PS | Book value of assets per share at the end of the fiscal year. |
| LIAB_PS | Book value of liabilities per share at the end of the fiscal year. |
| BV_LBV | Book value of equity at the end of the year, deflated by book value of equity at the beginning of the year. |
| EARN_LBV | Earnings before extraordinary items, deflated by deflated by book value of equity at the beginning of the year. |
| ΔEARN_LMV | Change in earnings before extraordinary items, deflated by deflated by market value of equity at the beginning of the year. |
| EARN_LMV | Earnings before extraordinary items, deflated by market value of equity at the beginning of the year. |
| ACCR_LMV | Accruals, defined as $(\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - DEP$, following Aboody et al. (2002), where ΔCA is the change in current assets, $\Delta Cash$ is the change in cash and cash equivalents, ΔCL is the change in current liabilities, ΔSTD is the change in debt included in current liabilities, ΔTP is the change in tax payable, and DEP is the depreciation and amortization expense. We deflate this accrual measure by opening market value of equity. |
| CFO_LMV | Cash flow from operations, deflated by market value of equity at the beginning of the year. |
| <i>Independent variables – Non-financial</i> | |
| LogNTABLES | The logarithm (base 10) of (1 + the number of table games). |
| LogNSLOTS | The logarithm (base 10) of (1 + the number of slot machines). |
| TABLE_SLOT_RATIO | The ratio of number of table games to number of slot machines, multiplied by 100. |
| TABLE_SLOT_RATIO_SQ | The square of TABLE_SLOT_RATIO. |