Determinants of Capital Expenditures in the U.S. Restaurant Industry

INTRODUCTION

The purpose of this research is to identify the determinants of capital expenditures in the U.S. restaurant industry. This research is motivated by two major factors. The first is related to previous research that highlights the importance of capital expenditures to the firm (Kerstein & Kim, 1995; Schmidgall et al., 1997; Brailsford & Yeoh, 2004; Jiang et al., 2006). Second, to the knowledge of the authors, very little hospitality research has examined which variables determine restaurant capital expenditures.

According to Dang (2007), successful hotel performance depends on the ability of asset managers to successfully implement capital expenditures. Thus it is essential for managers to be informed of the factors that influence capital spending. It would also be beneficial for consultants, policymakers, and researchers to understand the causal relationship between capital expenditures and their associated exogenous variables.

A capital expenditure is the total amount of money spent on renovation, refurbishing and replacing furniture, fixtures and equipment (FF&E) over a specific period of time and the cost to correct or update obsolescence (Dang, 2007). As Schmidgall et al. (1997) indicate, the difference between revenue expenses and capital expenditures is that revenue expenses are offset against the revenue of the year in which they are incurred while capital expenditures are those whose benefits realized over a time greater than a year. In other words, capital expenditures (CapEx) are expenditures creating future benefits. Thus, acquisitions of property should also be considered capital expenditures.

According to the data collected by the Stern School of Business at New York University, capital expenditure at U.S. restaurant industry peaked at $12 million in 2002,

and then dropped to $6.5 million in 2003. Although it went up to $11 million in 2004, the amount dropped down again at $6 million in 2005 and has not exceeded $8 million since. The following figure shows the U.S. restaurant industry CapEx from 2002 to present.

Insert Figure 1 here

This paper is organized in the following manner. The next section will examine past restaurant literature and research relevant to capital expenditures. This will be followed by the data and methodology employed. The results of the statistical analysis will be subsequently presented and followed by a conclusions and recommendations section.

LITERATURE REVIEW

Capital expenditures have received little attention (Brailsford & Yeoh, 2004), especially in the restaurant industry; and only a limited amount of research has examined the determinants of capital expenditures. John and Mishra (1990) find that growth opportunities will affect the valuation of capital expenditures. Brailsford and Yeoh (2004) jointly examine the role of growth and cash flow, and the interaction between them. Other researchers also find positive association between corporate earnings and capital expenditures (Jiang et al., 2006; Kerstein & Kim, 1995).

The relationship between growth opportunities and CapEx

a. Definition of growth opportunities

A growth opportunity is an investment or project that has the potential to grow significantly, leading profits for the investor. Myers (1977) describes growth opportunities as call options whose values depend on the likelihood that management will exercise them. Myers believes the market value of the firm (V) can be broken down into the present value of assets already in place (V_A) and the present value of future growth opportunities (V_G), that is , $V= V_A + V_{G.}$ Since the firm may choose not to pursue future investment opportunities, V_G can be regarded as the present value of the firm's options to make future investments. Kester (1984) expands the definition of growth opportunities as real value to the firm. New investments are often presented to potential investors as growth opportunities. The firm is composed of the value of assets in place and the value of growth opportunities. The lower the proportion of firm value represented by assets in place is, the higher the growth opportunities for a given level of firm value are (Fouad & Ahmed, 2001).

b. The link between growth opportunities and Capex

John and Mishra (1990) argue that individual firm factors such as growth will affect the valuation of capital expenditures. However, their approach was criticized by Kerstein and Kim (1995) because investment information was seen in absolute terms. Some other studies have investigated the valuation impact of capital expenditure and examined the role of growth opportunities (Szewczyk, et al., 1996; Chen & Ho 1997; Chung, et al., 1998). These studies use *q* ratio[1] as a proxy for growth opportunities and report positive

[1] The *q* ratio is calculated as the market value of a company divided by the replacement value of the firm's assets, also called the "market-to-book ratio".

relationship between *q* ratios and net present value (NPV). Therefore, positive valuations are expected to be greater for firms with higher growth prospects.

Brailsford and Yeoh (2004) extend the literature into the market valuation of announcements of capital expenditure. They argue that the firm's opportunity set as represented by its growth opportunities and its cash flow position in relation to those opportunities affect the market valuation. Their results show that growth opportunities are significantly important to explain the market reaction to capital expenditure announcements. Thus, the first research hypothesis of this study is:

Hypothesis 1: Growth opportunities have a positive impact on CapEx.

The relationship between free cash flow and CapEx

An agency problem is a conflict of interest arising between principals (i.e. shareholders) and agents (i.e. company's executives) because of differing goals. According to Jensen (1986), payouts to shareholders reduce the resources under managers' control, thereby reducing managers' power, and making it more likely they will incur the monitoring of the capital markets which occurs when the firm must obtain new capital (Rozeff, 1982; Easterbrook, 1984).

Free cash flow is cash flow in excess of that required to fund all projects that have positive NPV when discounted at the relevant cost of capital. It is a manifestation of agency problems because excess cash may not be returned to shareholders. Conflicts of interest between shareholders and managers over payout policies are especially severe when the organization generates substantial free cash flow (Jensen, 1986). When firms have free cash, any acquisitions made by these firms are, by definition, negative net

present value investments because these firms face an investment opportunity set in which there are no favorable growth prospects (Brailsford & Yeoh, 2004).

Kadapakkam, Kumar, and Riddick (1998) find that investments in financially constrained firms would be determined by their cash flow. They also indicate that the cash flow investment sensitivity is highest in large firms and smallest in small firms. Furthermore, this relationship is independent of the measure of firm size. Brailsford and Yeoh (2004) also state that cash flow has a role interacting with growth opportunities, which explains the market reaction to capital expenditure announcements. Although some other researchers (i.e. Chen & Ho, 1997) find no support for the free-cash-flow hypothesis, the authors still believe there is a positive relationship between CapEx and free cash flow:

***Hypothesis 2: Free cash flow has positive impact on CapEx*.**

The link between corporate earnings and CapEx

a. Importance of corporate earnings

Corporate earnings represent how much profit a firm has made during a certain period of time. One of the main purposes of corporate earnings reports is so that both potential investors and current investors can see whether the company is growing, or if the company is at risk of failure. By evaluating the earnings reports, investors can determine if the company is spending too much money, and not earning enough of a profit. They are able to determine if the company is increasing in profit from year to year, or if the company earnings have dropped from the previous year.

b. The link between corporate earnings and Capex

Jiang et al. (2006) have documented a significantly positive association between capital expenditures and subsequent corporate earnings. Moreover, their results indicate a significantly positive association between capital expenditures and future corporate earnings even after controlling for current corporate earnings. Kerstein and Kim (1995) also argue that capital expenditure changes are strongly and positively associated with excess returns. However, according to agency theory (Jensen & Meckling, 1976; Jensen, 1986), agency costs may be incurred when managers and owners have conflicting interests. Managers may make investment decisions to expand the resources under their control due to self-interest, while those investment projects do not have positive net present values. In other words, the agency theory suggests that the association between capital expenditures and future corporate earnings need not be positive. To examine the relationship between CapEx and corporate earnings, the authors hypothesize the following:

Hypothesis 3: Corporate earnings have a positive impact on CapEx.

The link between economic conditions and CapEx

In a booming economy, many firms use funds to finance inventories or even acquire other firms. These actions keep the demand for capital at a high level, and interest rates higher than they otherwise might be. While refurbishment or replacement of existing equipment is a capital expenditure associated with an internal growth strategy, acquisitions represent an external growth strategy. Hence, acquisitions are made during strong economic times, but CapEx are typically made during weaker economic conditions (Elsas, Flannery, & Garfinkel, 2006).

Pitchaya and Ed (2002) investigate the relationship of internal and external financing and firm growth opportunities before and after the 1997 Thailand economic crisis. Results show that the primary resort of financing switched from external to internal after the crisis, with external long-term financing levels decreasing after the crisis, with external long-term financing levels decreasing after the crisis. The findings also show that external long-term financing in a given period is significant and is positively related to associated capital expenditures for the overall sample period. The authors expect a negative relationship between CapEx and non-recessionary economic conditions.

Hypothesis 4: Non-recessionary economic conditions have a negative impact on CapEx.

The relationship between size and CapEx

According to Kadapakkam et al. (1998), large firms tend to have the most sensitive cash flow-investment sensitivity due to more flexibility of investment timing. Haller and Murphy (2012) also find that firm size is one main determinant of capex. Asquith et al. (1983) argue that insignificant abnormal returns to bidders may be explained by the relative size of targets to bidders, and they find that bidders' cumulative abnormal returns are positively related to target size. This result is consistent with a materiality argument in that the market reacts only to announcements that have a potentially significant impact on the bidders' value. Therefore, the fifth hypothesis of this study is as follows:

Hypothesis 5: Size of the firm has a positive impact on CapEx.

Conclusion

Based upon a review of the pertinent literature already discussed, this paper

examines relationship of CapEx and the following variables: growth opportunities, free cash flow, corporate earnings, economic condition, and size. The next section will describe the hypotheses to be tested as well as the data used and methodology employed to test them.

HYPOTHESES, DATA AND METHODOLOGY

To explore the potential factors for capital expenditures in the restaurant industry, this study takes a retrospective look with a focus on the hypothesized variables to understand the driving factors of CapEx. Data from Compustat (2002-2012) were used in this study. The selection of data was based mainly on data availability, the reliability of data sources, and the ability to quantify variables in the modeling process. A total of 78 companies with 503 observations were included in the sample. After removing outliers, 447 restaurant-year observations were used for the analysis.

Variables

a. Dependent variable

The dollar amount of capital expenditures (CapEx) is the dependent variable in this study. Following Braisford and Yeoh's (2004) methods, the study uses a narrow definition of a capital expenditure, which only includes expenditure that is strictly physical in nature. Such expenditures include those on plant, machinery, property, equipment and other forms of physical asset expenditures. This last classification would include construction of a new plant, installation of a new plant, and upgrading of an existing plant. However, it excludes assets acquired through mergers and takeovers.

b. Independent variables

Growth opportunities (GO) are measured by the market to book (M/B) ratio as

much prior research has done (Kim & Sorensen, 1986; Titman & Wessels, 1988; Rajan & Zingales, 1995). A firm's market to book ratio is measured using Compustat data, and is defined as the market value of equity at the end of the fiscal year divided by the book value of equity (See formula 1). The book value of equity is defined as total assets (AT) minus total liabilities (LT). We exclude firms with book-to-market ratios of less than 0.01 and greater than 100. The use of this proxy is consistent with prior research in the area (Fama & French, 1993; 1996) and elsewhere.

Market to Book ratio = Market value/ Book value

$$= MKVALT/ (AT - LT) \qquad (1)$$

Free cash flow firms, by definition, are those firms operating with high cash flow in a low growth environment (Jensen, 1986). As free cash flow is cash flow in excess of requirements, high cash flow alone is not a sufficient condition for free cash flow to be present, as a high cash flow firm may have a sufficiently large pool of positive NPV investment projects. Hence, a low growth environment is also necessary. Thus, cash flow is used as an independent variable.

Cash flow (CF) is calculated using the approach of Lang, et al. (1991) as follows:

$$CF = EBIT + DP- TXT - DVT – INT \qquad (2)$$

where EBIT is earnings before interest and tax and extraordinary items, DP is depreciation expense, TXT is total tax expenses, DVT is total dividend paid on ordinary and preferred shares, and INT is total interest expenses.

Corporate earnings (E) are measured using the ratio of the firm's earnings before interest and taxes at the end of the year. This amount is then standardized by the amount of firm assets which yields the return on asset ($ROA_{i,t}$) ratio. More specifically, the

calculation of this variable is the ratio of firm *i*'s earnings before interest and taxes reported at the end of year *t*, to the level of total assets reported at the beginning of year *t*, TA_{t-1}.

Because of economic conditions and the changes with shifts over time in informativeness, we focus on the past 10 years (2002-2012), since that covers the most recent economic recession which affected the restaurant industry. Therefore, economic conditions (Eco) are coded as 0 if the data was collected in 2007-2009[2], which covers U.S. economic recession years (Izzo, 2010) or 1 otherwise.

As a result, the relationship between capital expenditures in the U.S. restaurant industry and the determinants is stated as:

CapEx=*f* (GO, CF, E, Eco, Size,)…..

$$= \alpha_0 + \alpha_1 GO_{it} + \alpha_2 CF_{it} + \alpha_3 E_{it} + a_4 Eco_{it} + a_5 Size_{it} + e_i \quad (3)$$

Where:

$CapEx_{it}$ =Total capital expenditures for firm *i* in year *t*

GO_{it}=Growth opportunities for firm *i* in year *t*

CF_{it}=Cash flows for firm *i* in year *t*

E_{it}=Earnings (ROA) for firm *i* at the end of year *t*

Eco_t=Economic conditions in year *t (0=economic recession year, 1=otherwise)*

$Size_{it}$=Restaurant size for firm *i* in year *t*

Ei = the error term of the regression

t=years 2002 through 2012.

[2] The statement of 2012 recession is controversial. Some researchers believe the new recession starts from late 2012. However, according to the Economic Cycle Research Institute (ECRI), the U.S. is four years into a rebound from a recession that began in 2007 and ended some 24 months later. The argument is mainly based on the U.S. GDP growth, thus we excluded 2012 as recession year.

In the above model, CapEx served as the dependent variable, while other variables served as the independent variables for the model in (3).

RESULTS

Summary statistics of key variables are reported in Table 1. The final sample consists of 447 restaurant firm-year observations from 2002 to 2012. Variables include growth opportunities (measured by the market-to-book ratio), cash flows, earnings (measured by return on assets), economic conditions, and firm size (measured by total assets).

CapEx of the restaurants in the sample ranged from $0 to $185.738 million, with an average of $37 million. As can be seen, this average is much larger than the industry average shown in Figure 1. One possible explanation is that restaurants included in the Compustat are primarily large companies that have more assets and CapEx than the industry average.

Insert Table 1 here

Pearson correlation analysis results are provided in Table 2. Almost all of the independent variables (M/B, CF, Size, ROA) were significantly associated with CapEx.

Insert Table 2 here

To identify what factors were related to restaurant CapEx, a multiple regression method was employed. As stated previously, the dependent variable was CapEx.

Growth opportunities (measured by the M/B ratio), cash flow (CF), Corporate earnings (measured by ROA), Size (measured by total assets), and economic conditions (Eco) were used as independent variables. In Table 3, unstandardized coefficients (B), standard error of unstandardized coefficients (SE B), standardized coefficients (β), and t statistic (t) are reported.

Insert Table 3 here

As expected, a regression model consisting of M/B ratio, CF, ROA, Size, and Eco significantly predicted the CapEx of U.S. restaurants. The regression model indicated that M/B ($p<.001$), CF ($p<.001$), Size ($p<.001$), ROA ($p=.045$) and Eco ($p=.019$) contributed to the prediction of CapEx. The adjusted r-squared value was 54% and the overall F test for regression relation was 101.5, highly significant at $p<.001$. Each of the proposed research hypotheses is supported by the results. Thus, all predictors except Eco were positively associated with CapEx. Only Eco, which was a significant predictor of CapEx had a coefficient with a negative sign. Therefore, the mean response regression equation for U.S. restaurant CapEx is estimated to be:

$$Y_{CapEx} = 14.398 + 3.062MB + .266CF + 20.74ROA + 0.022Size - 7.064Eco$$

CONCLUSIONS AND DISCUSSION

The primary purpose of this study was to examine determinants of capital expenditures in the U.S. restaurant industry. Data from CompuStat were collected and analyzed using a multiple regression model. The study found that growth opportunities, free cash flow, above-average corporate earnings, and size were positive determinants of

capital expenditures, while the economic recession was a negative determinant of capital expenditures.

Growth opportunities

The results of this study indicate that growth opportunities tend to be positively associated with capital expenditures. This is consistent with the results from previous research (Szewczyk et al., 1996; Chen & Ho, 1997; Chung et al., 1998). That is to say, in the restaurant industry, growth opportunities tend to positively influence the amount of capital expenditures made by restaurant firms.

There is much literature about firm growth opportunities and firm capital structure (Myers, 1977; John & Mishra, 1990; Kerstein & Kim, 1995; Szewczyk et al., 1996; Chen & Ho, 1997; Chung et al., 1998; Fouad & Ahmed, 2001; Brailsford & Yeoh, 2004). Myers (1977) states that firms with high growth opportunities are more likely to suffer from debt overhang problems. Risky debt induces firms to forego some profitable investment opportunities, resulting in a suboptimal investment policy for the firm. Moreover, Jensen and Meckling (1976) argue that the conflict of interest between debt holders and equity holders could provide an incentive to over-invest in risky projects that could ultimately reduce firm value. One possible solution is to mitigate these types of problems is to use more equity financing than debt financing.

Myers (1984) and Myers and Majluf (1984) advocate that firms resort to internal funds first, then debt, and equity last to satisfy their financing needs. This pecking order of financing is driven by asymmetric information between investors and firm managers. Under a dynamic version of this theory, restaurants may also forego some positive NPV projects if they have to issue equity in order to invest. To correct this, restaurants with

high growth opportunities should accumulate financial slack today in anticipation of new financing needs for these future investments.

Free cash flow

According to the discounted cash flow (DCF) model, the value of a company is equivalent to the present value of its future cash flow generation capability. In other words, the pure value of a business is the future estimated cash flow discounted at a rate that mirrors the risk of cash flow (Copeland et al., 1994). Unlike accounting measures, such as earnings, DCF conceptualizes the importance of projected cash flows and the time value of money.

Free cash flow reflects the difference between cash inflows and outflows from operating units. These cash flows are relevant for projecting firm value because they represent the cash available for a firm's financial obligations, such as debt and dividends (Rappaport, 1998). Thus, in terms of restaurant capital expenditures, the accurate identification of a target's cash flow generation capability is crucial to the financial manager.

The results from this study show that cash flow is positively associated with capital expenditures; this is different from Chen and Ho (1997)'s findings, but is consistent with Brailsford and Yeoh (2004)'s findings.

Corporate earnings, Size, and Economic conditions

The results shown herein regarding both corporate earnings and firm size are also consistent with previous research (Jiang et al., 2006; Kerstein & Kim, 1995). This means that higher corporate earnings and larger size tends to be associated with higher capital

expenditures. As for the impact of the most economic recession on capital expenditure, the results indicate that restaurants tend to increase their capital expenditures. This finding is consistent with that of previous research (Elsas et al, 2006) that shows these expenditures are more common during weaker economic conditions.

LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

This research is an initial attempt to investigate the determinants of capital expenditures of restaurant in the U.S. While positive empirical results have been obtained, there are some limitations in the current study. First, due to data availability, this research analyzes data for only 78 restaurants (447 observations). A future study naturally could examine a larger data set to see whether the included independent variables still significantly affect restaurant capital expenditures. Second, only five independent variables were used in the regression model. As the adjusted r-squared is only 54%, there is room to include more variables as potential determinants for CapEx. Third, this paper primarily focuses on restaurants. It is reasonable to believe that other sectors of the hospitality industry may not have the same results.

Further research on this topic may include the idea that large firms utilize capital expenditures in a different fashion than smaller firms. Additionally, the factors impacting capital expenditure decisions may be time sensitive. Therefore, an examination of capital expenditure behavior in other time periods may be useful. Finally, this paper only examines one sector of the hospitality industry. It may be interesting to see if similar results can be found in other sectors of the hospitality industry such as hotels and casinos.

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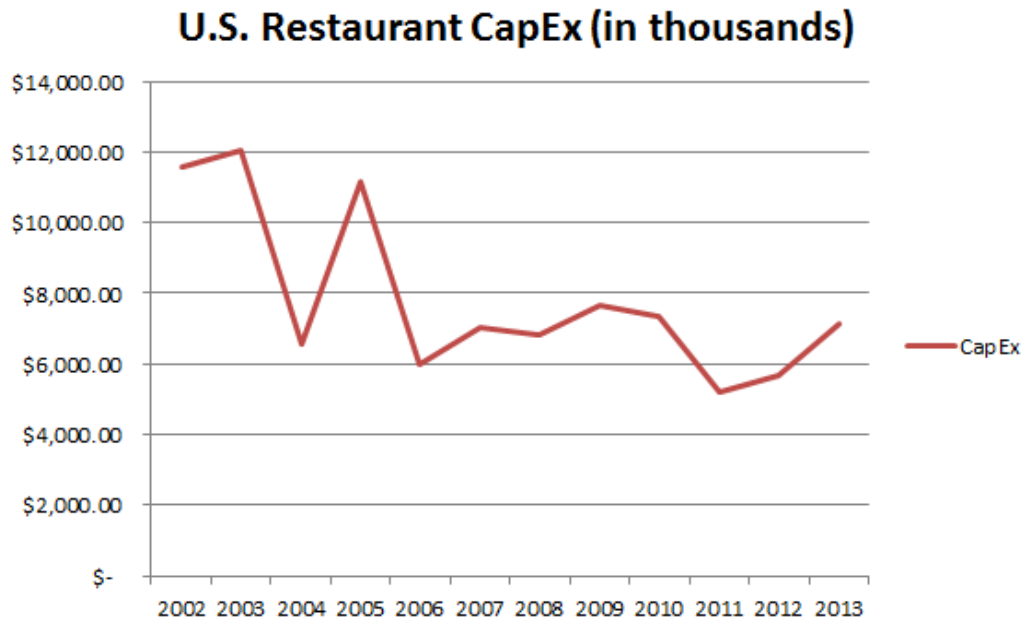
Figure 1.



Summary of estimated U.S. restaurant industry Capital Expenditures (CapEx) from 2002 to present. (Source: NYU Stern School of Business Data Page: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/data.html?pagewanted=all.

Table 1: Summary Statistics.

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
CapEx	447	37.402	16.098	45.577	0	185.738
M/B	447	1.223	0.837	1.455	0	18.13
CF	447	45.786	18.099	74.605	-778.17	296.546
ROA	447	0.005	0.045	0.155	-1.023	0.341
Size	447	472.361	189.253	706.941	0.38	4975.42
Eco	447	0.51	1	0.5	0	1

Notes:

CapEx = Total capital expenditures, in millions of dollars.

M/B =Market to book value= Market Value / (Total Assets – Total liabilities).

CF = Cash flow = Earnings before Interests and Taxes + Depreciation Expense - Tax Paid- Dividend Paid – Interest Expense.

ROA = Return on Asset= Earnings before Interest and Taxes / Total Assets.

Size = Total Assets.

Eco = Economic condition = 0 if the data was collected in 2007-2009, which indicates economic recession years in the U.S or 1 otherwise.

Table 2 Pearson Correlation Analysis

	CapEx	MB	CF	ROA	Size	Eco
CapEx	1					
M/B	0.182** (0.000)	1				
CF	0.665** (0.000)	0.158** (0.001)	1			
ROA	0.297** (0.000)	0.237** (0.000)	0.322** (0.000)	1		
Size	0.597** (0.000)	-0.012 (0.802)	0.573** (0.000)	0.174** (0.000)	1	
Eco	0.011 (0.813)	-0.042 (0.372)	0.103 (0.030)	-0.043 (0.368)	0.147** (0.002)	1

Notes:

CapEx = Total capital expenditures, in millions of dollars.

M/B =Market to book value= Market Value / (Total Assets – Total liabilities).

CF = Cash flow = Earnings before Interest and Taxes + Depreciation Expense - Tax Paid- Dividend Paid – Interest Expense.

ROA = Return on Asset= Earnings before Interests and Taxes / Total Assets.

Size = Total Assets.

Eco = Economic condition = 0 if the data was collected in 2007-2009, which indicates economic recession years in the U.S or 1 otherwise.

P-values are reported in parentheses.
*p<0.05
**p<0.001

Table 3 Regression Analysis Results.

Predictor	B	SE B	β	t
Constant	14.398	2.644		5.445**
MB	3.062	1.060	.098	2.888**
CF	.266	.025	.435	10.425**
ROA	20.740	10.327	.070	2.008*
Size	.022	.003	.348	8.672**
Eco	-7.064	3.002	-.078	-2.354*

Notes: R^2*=0.731, Adj* R^2*=0.54*

B represents unstandardized coefficients; β represents standardized coefficients.

* $p<0.05$

** $p<0.001$

CapEx = The dependent variable of the regression which is total capital expenditures, in millions of dollars.

M/B =Market to book value= Market Value / (Total Assets – Total liabilities).

CF = Cash flow = Earnings before Interests and Taxes + Depreciation Expense - Tax Paid- Dividend Paid – Interest Expense.

ROA = Return on Asset= Earnings before Interest and Taxes / Total Assets.

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