Internet Appendix:

Construction, Real Uncertainty, and Stock-Level Investment Anomalies

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In this Internet Appendix, we offer supplementary theoretical and empirical material not in our main paper. In Section IA.1, we present robustness test results for our main empirical finding that constructing stocks largely drive the investment anomaly in Section 2 of our main paper (Tables IA.1 and IA.2). In Section IA.2, we stress several implications of that finding, revealing that construction also conditions the pricing of popular alternative investment proxies (Table IA.3) and that a Fama-French (2015) CMA investment factor formed from constructing stocks outperforms the corresponding factor formed from non-constructing stocks and spans the original CMA factor (Table IA.4). Section IA.3 derives the quasi-closed-form solution for our real options model with newly-built capacity in Section 3 of our main paper. In Section IA.4, we offer comparative statics for the effect of real investments on the expected firm return in that model. Section IA.5 derives the quasi-closed-form solution for an extended version of our model including time-to-build, establishing that time-to-build does not change our main theoretical conclusions (Table IA.5). In Section IA.6, we offer robustness test results for our additional evidence supporting our uncertainty explanation for why construction conditions the investment anomaly in Section 4 of our main paper (Tables IA.6 and IA.7). In Section IA.7, we finally offer some results based on firm fundamental comparisons refuting alternative explanations for our main empirical evidence (Table IA.8).

IA.1 Robustness of Our Main Empirical Evidence

In this section, we examine the robustness of our main empirical evidence. We first study how several reasonable methodological variations affect our main regression results. We next evaluate whether our main conclusions also emerge in weighted regressions.

IA.1.1. Sample Choice and Variable Construction

In Section 2 of our main paper, we use standard portfolio sorts and Fama-MacBeth (FM; 1973) regressions to demonstrate that constructing stocks drive the investment anomaly. In this section, we show that this conclusion is robust to methodological variations. To do so, we repeat the full-sample FM regression and the subsample regressions separately run on constructing and non-constructing stocks in columns (1), (4), and (5) of Table 3 in our main paper, studying each variation at a time. As variations, we (i) omit observations with missing PPE-CIP values rather than setting them to zero; (ii) treat as constructing firms those with positive PPE-CIP values at the start or end of the fiscal year ending in calendar year $t-1$ rather than only those with positive values at the end of that fiscal year; (iii) retain service firms; (iv) retain firms with sales below $25 million over the fiscal year ending in calendar year $t-1$ (or, alternatively, (v) drop firms with a stock price below $5 at the end of June of calendar year t rather than those with a market size below the first quartile at the end of June of calendar year t) from start July of calendar year t to end June of calendar year $t + 1$; and (vi) use delevered stock returns.[1]

Internet Appendix Table IA.1 presents the results from the FM regressions incorporating the six methodological variations, with each column concentrating on a single variation. While row (1) shows the full-sample *Investment* premium, rows (2) and (3) reveal the corresponding premiums in the constructing and non-constructing stock subsamples, respectively, with row (2)–(3) calculating the difference between the subsamples. The plain numbers and those in square brackets are monthly estimates (in %) and Newey-West (1987) t-statistics with a six month lag length, respectively. For the sake of brevity, the table does not report the control variable estimates (which however remain similar to those in our main paper).

The table suggests that our main empirical results are largely robust. Columns (1) and (2) demonstrate that our treatment of missing PPE-CIP values or our definition of constructing firms hardly affects our inferences. Conversely, column (3) reveals that the retention of service firms, which, in line with intuition, only rarely physically build additional capacity, dampens (amplifies) the *Investment* premium in constructing (non-constructing) stocks, without however eliminating the negative difference between the subsamples. Columns (4) and (5) confirm that alternative screens based on market size, stock price, and sales only marginally influence our conclusions. Finally, column (6) shows that our main empirical evidence becomes stronger when we account for stock return variations attributable to financial leverage.

IA.1.2. Weighted-Least-Squares FM Regressions

We next address the concern that our main FM regression results in Table 3 of our main paper could be biased if stock prices temporarily deviated from their true values, inducing an upward

[1]We follow Doshi et al. (2019) in calculating the delevered stock return as the original return multiplied by one minus the stock's financial leverage. We define financial leverage as the ratio of total liabilities to the sum of market size and total liabilities, where market size is from the end of the prior calendar year and total liabilities from the fiscal year ending in the prior calendar year. We use the thus calculated financial leverage value from June of the current calendar year to May of the next calendar year.

bias in the mean returns of especially smaller stocks. To rule out that such a bias distorts our evidence, Internet Appendix Table IA.2 reports the results from repeating the FM regressions in Table 3 of our main paper based on cross-sectional regressions weighting each observation with either market size at the end of calendar month $t-1$ (Panel A) or the gross return over that month (Panel B). Since stocks with temporarily inflated (deflated) prices at the end of calendar month $t-1$ are prone to also have inflated (deflated) market sizes and gross returns at that time, the weights correct for the mean return bias by overweighting (underweighting) their too low (high) future returns (see Asparouhova et al. (2010; 2013) for details).

Using the same design as Table 3 in our main paper, Internet Appendix Table IA.2 suggests that our main empirical evidence is robust to mean return bias induced through temporary deviations between stock prices and true values. Specifically, columns (2) and (3) confirm that *Construction* and the rank variable based on it continue to negatively condition the investment anomaly in the weighted FM regressions, whereas columns (4) and (5) demonstrate that the investment anomaly is again only significant in the constructing but not in the non-constructing stock subsamples in those same regressions. Using the past gross return as weight, column (3) in Panel B, for example, reports that a 25-percentile rise in PPE-CIP scaled by assets makes the investment premium more negative by 0.62% per month (t-statistic: –3.07).

Overall, this section suggests that our main conclusions are reasonably robust with respect to sample screens, variable definitions, as well as regression weights.

IA.2 Further Implications of Our Main Evidence

In this section, we gauge the wider implications of our main empirical evidence. We first study whether our main conclusions continue to hold for the pricing of popular alternative investment proxies. We next look into whether we can employ our main conclusions to come up with a refined version of Fama and French's (2015) CMA investment factor.

IA.2.1. The Effect on Alternative Investment Proxies

We now evaluate whether construction work also conditions the pricing of popular alternative investment proxies from prior studies. As firms can physically build only tangible assets, but some alternative proxies mix investments into tangible and intangible assets, it is unclear whether the conditioning effect of construction work also arises for those proxies.[2] The alternative proxies are: (i) Xing's (2008) CAPEX-to-PPE; (ii) Titman et al.'s (2004) abnormal CAPEX-to-sales; (iii) Peters and Taylor's (2017) capital growth; as well as (iv) Cooper et al.'s (2008) asset growth. While, in contrast to *Investment*, CAPEX-to-PPE and abnormal CAPEX-to-sales do not reflect merger-and-acquisition-induced expansions of physical productive capacity, capital growth (asset growth) also reflects expansions of intangible productive capacity (intangible productive capacity plus tangible as well as intangible non-productive capacity).

Using the same design as Internet Appendix Table IA.1, Internet Appendix Table IA.3 suggests that construction work affects the pricing of the alternative proxies, albeit to varying degrees. In particular, although the effect of construction work is highly significant for CAPEX-to-PPE and capital growth (see columns (1) and (3)), it is more marginally significant for abnormal CAPEX-to-sales and asset growth ((2) and (4), all respectively). The strong effect for CAPEX-to-PPE is unsurprising because the variable shares a high average cross-sectional correlation with *Investment*, in line with the intuition that mergers and acquisitions occur only infrequently. In comparison, the difference between the capital growth and asset growth effects is more noteworthy and could be driven by most investments into intangible productive

[2] If most intangible-capacity investments were supplementary to tangible-capacity investments, we would expect construction work to also negatively condition the pricing of proxies considering both investments into tangible and intangible capacity. If they were, however, largely independent, then the intangible-capacity component in those proxies would simply dilute the conditioning effect of construction work.

capacity — but not those into intangible non-productive capacity — being supplementary to investments into tangible productive capacity. Finally, the weak abnormal CAPEX-to-sales effect is also noteworthy but may result from the fact that the variable is a better proxy for the change in investment levels over time, rather than investment levels themselves.

IA.2.2. A Refined CMA Investment Factor

Given our evidence that construction work conditions the asset growth anomaly in the prior subsection, it could also be behind the pricing power of the investment factors featured in recent linear factor models (see, e.g., Fama and French (2015; 2016) and Hou et al. (2015; 2021)). To find out, we follow Fama and French (2015; 2016) and exactly replicate their CMA investment factor using either all stocks, constructing stocks (*DummyConstruction*=1), or non-constructing stocks (0).[3,4] Figure IA1 plots the cumulative returns of the three versions of the CMA factor over our sample period. Strikingly, the figure suggests that, despite the relatively marginal ability of construction work to condition the asset growth premium in Internet Appendix Table IA.3, the CMA factor formed from constructing stocks is far more profitable than those formed from all or non-constructing stocks. More specifically, while the constructing-stock factor earns an almost 150% excess return, the corresponding number for

[3]More specifically, at the end of each June in calendar year t, we first consider either all stocks, constructing stocks, or non-constructing stocks from the sample of NYSE, AMEX, and Nasdaq stocks with share codes 10 and 11 and non-missing market size on that date and non-missing total asset values over the fiscal years ending in calendar years $t-1$ and $t-2$. We then form those stocks into two portfolios according to the NYSE median of the market size distribution on that date and, independently, into three portfolios according to the NYSE 30th and 70th percentiles of the distribution of total asset growth over the fiscal year ending in calendar year $t-1$. We value-weight the portfolios and hold them from start July of calendar year t to end June of calendar year $t+1$. We next form a high (low) investment portfolio by taking an equal position in the small and large-size top (bottom) investment portfolios. We finally construct the CMA investment factor as the spread portfolio long the low and short the high investment portfolio. See Kenneth French's website, <https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/>, for more details.

[4]We focus on Fama and French's (2015; 2016) investment factor since Hou et al.'s (2015; 2021) is formed from an independent triple sort based on market capitalization, quarterly profitability (i.e., ROE), and investment. Separately replicating Hou et al.'s (2015; 2021) factor on constructing and non-constructing stocks thus produces many empty or ill-diversified portfolios, especially in the early sample years.

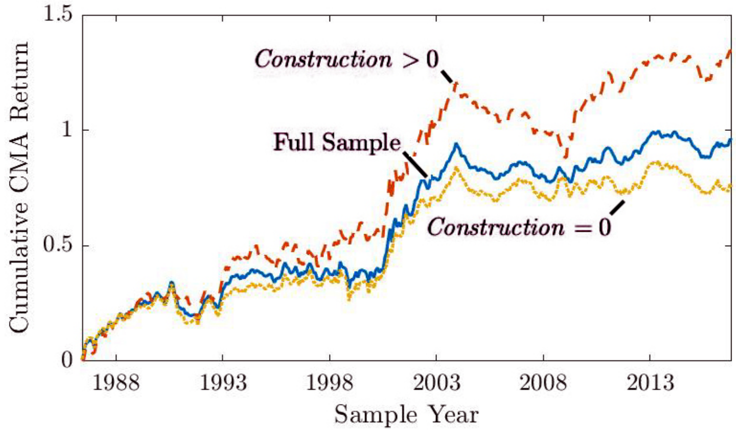

Figure IA1: The Cumulative Returns of CMA Investment Factors Formed from All, Constructing, and Non-Constructing Stocks In this figure, we plot the cumulative returns of Fama and French's (2015; 2016) CMA investment factor formed from either all stocks (solid blue line), constructing stocks (dashed red line), and non-constructing stocks (dotted yellow line) over our sample period.

the all (non-constructing) stock factors are about 100% and 75%, respectively.

Since the greater profitability of the constructing-stock CMA factor in Figure IA1 does not necessarily imply that the factor explains a larger fraction of the ability of the original factor to price stocks than its counterpart, we next consider spanning tests. In the spanning tests, we run time-series regressions of the original factor on combinations of the contemporaneous constructing and non-constructing stock factors. A statistically insignificant intercept implies that the regressor factors *span* the regressant factor and, in turn, explain the factor's pricing ability. Internet Appendix Table IA.4 shows the spanning test results. Column (1) confirms that the original factor is significantly positively priced over our sample period. More importantly, while column (2) reports that the constructing-stock factor spans the pricing power of the original factor (intercept: 0.04; t-statistic: 0.77), column (3) indicates that the non-constructing factor does not do so (intercept: 0.07; t-statistic: 2.30). In accordance, column (4) reveals that the two factors together also span the original factor. A noteworthy aspect of these results is that the greater spanning of the constructing-stock factor arises despite the fact that the factor is less strongly related to the original factor than its counterpart (compare the coefficients and t-statistics of the two factors in columns (2) to (4)).

Taken together, this section shows that construction work also conditions the stock pricing ability of alternative investment proxies, albeit sometimes more weakly. In line with that result, it further establishes that a refined Fama-French (2015; 2016) CMA investment factor formed from constructing stocks is more profitable than the original factor and its counterpart formed from non-constructing stocks and that this factor (but not its counterpart) explains the well-established success of the original factor to price stock returns.

IA.3 Main Real Options Model Derivations

In this section, we derive the quasi-closed-form solutions for the values and expected returns of the mature factory, the newly-built factory, and the growth option on the newly-built factory, each allowing the firm to produce one output unit per time unit at a long-run cost of C_k and to sell that at the price θ. To do so, we first show how to derive the ordinary differential equation (ODE) which the assets have to fulfill. Based on that ODE, we next derive the expected returns of the assets. After that, we detail how to solve the ODEs of the assets subject to the asset-specific boundary conditions. We finally derive the optimal number of factories.

IA.3.1. Ordinary Differential Equation and Expected Return

IA.3.1.1. Deriving The Ordinary Differential Equation

Consider an asset whose value, V, depends on the state variable θ; whose instantaneous profits are π per time unit; and which in each instant has a fixed idiosyncratic probability equal to λ per time unit of transforming into another asset with value V^a. Let us further assume that the state variable θ obeys the geometric Brownian motion (GBM):

$$d\theta = \alpha\theta dt + \sigma\theta dW, \tag{IA1}$$

where α is the constant drift and σ the constant volatility of the state variable, and W is a Brownian motion. We finally assume that the expected return of an asset (or asset portfolio) perfectly positively correlated with the state variable is a constant μ.

Assuming complete spanning and the absence of arbitrage opportunities, the first two fundamental theorems of asset pricing state that the expected excess return (i.e., the expected return minus the riskfree rate) of each asset equals minus one times the covariance between the asset's return and the realization of a unique stochastic discount factor. Denoting that stochastic dicount factor by Λ, let us posit that its differential obeys the GBM:

$$d\Lambda = -r\Lambda dt + \sigma_\Lambda \Lambda dW^{(\Lambda)}, \tag{IA2}$$

where r is the constant riskfree rate of return, σ_Λ the constant volatility of the stochastic discount factor, and $W^{(\Lambda)}$ a Brownian motion. Moreover, $dWdW^{(\Lambda)} = \rho dt$, where ρ is the instantaneous correlation between the Brownian motions modelling the output price and the stochastic discount factor. In that case, the expected excess return of the asset is:

$$E[dV/V] + \pi/V dt - rdt = -cov(dV/V, d\Lambda/\Lambda), \tag{IA3}$$

or equivalently:

$$E[dV] + \pi dt - rV dt = -cov(dV, d\Lambda/\Lambda). \tag{IA4}$$

Using Itô's Lemma, it is obvious that $E[dV] = \alpha\theta V_\theta dt + \frac{1}{2}\sigma^2\theta^2 V_{\theta\theta} dt + \lambda(V^a - V)dt$ and that

$-cov(dV, d\Lambda/\Lambda) = -\rho\sigma\sigma_\Lambda \theta V_\theta dt$. Plugging in, dividing by dt, and shuffling all the summands to the left-hand side, we are able to rewrite Equation (IA4) as:

$$\frac{1}{2}\sigma^2\theta^2 V_{\theta\theta} + (\alpha + \rho\sigma\sigma_\Lambda)\theta V_\theta - (r+\lambda)V + \pi + \lambda V^a = 0. \tag{IA5}$$

Defining $\mu \equiv r - \rho\sigma\sigma_\Lambda$,[5] recalling that $\delta \equiv \mu - \alpha = r - \rho\sigma\sigma_\Lambda - \alpha$, and plugging in, we arrive at the ODE which the asset needs to satisfy subject to boundary conditions:

$$\frac{1}{2}\sigma^2\theta^2 V_{\theta\theta} + (r - \delta)\theta V_\theta - (r+\lambda)V + \pi + \lambda V^a = 0. \tag{IA6}$$

IA.3.1.2. Deriving The Expected Asset Return

We next derive the instantaneous expected excess return of the asset from the prior subsection, $E[R_A] - r$. To achieve that goal, we start from the definition of that return:

$$(E[R_A] - r)dt = E[dV/V] + \pi/V dt - r dt. \tag{IA7}$$

Using Itô's Lemma, we can rewrite that definition as:

$$(E[R_A] - r)dt = \alpha\theta V_\theta/V dt + \frac{1}{2}\sigma^2\theta^2 V_{\theta\theta}/V dt + \lambda(V^a - V)/V dt + \pi/V dt - r dt. \tag{IA8}$$

We now notice that we can rewrite ODE (IA6) as:

$$\alpha\theta V_\theta dt + \frac{1}{2}\sigma^2\theta^2 V_{\theta\theta} dt + \lambda(V^a - V)dt = \alpha\theta V_\theta dt + (\delta - r)\theta V_\theta dt + rV dt - \pi dt, \tag{IA9}$$

[5] We can interpret μ as the expected return of the asset (or asset portfolio) perfectly replicating the state variable θ since $-cov(d\theta/\theta, d\Lambda/\Lambda) = -\rho\sigma\sigma_\Lambda dt$.

or, recalling that $\delta \equiv \mu - \alpha$, as:

$$\alpha\theta V_\theta dt + \frac{1}{2}\sigma^2\theta^2 V_{\theta\theta}dt + \lambda(V^a - V)dt = (\mu - r)\theta V_\theta dt + rVdt - \pi dt. \tag{IA10}$$

Plugging Equation (IA10) into (IA8), we finally have:

$$E[R_A] - r = V_\theta\theta/V(\mu - r). \tag{IA11}$$

In words, the expected excess return of the asset is the asset's elasticity, $V_\theta\theta/V$, multiplied by the expected excess return of the state variable replication portfolio.

IA.3.2. Valuing the Mature Factories

We next value the mature factory allowing the firm to produce one output unit per time unit at a unit cost of C_k when the firm decides to switch on the factory. Since the mature factory can no longer transform into another asset, it has to fulfill ODE (IA6) with $\lambda = 0$. Also, since switching on the factory is costless and instantaneous, the firm optimally does so whenever the factory produces a profit (i.e., whenever $\theta \geq C_k$), implying that the profit per time unit, π, is equal to $\theta - C_k$ whenever the factory is switched on and else zero.

Using standard techniques (see, e.g., Dixit and Pindyck (1994)), we can show that the solutions to the two ODEs of the mature factory with production cost C_k and therefore its operating and idle values, $V^m_{k,o}$ and $V^m_{k,i}$, respectively, need to be of the general forms:

$$V^m_{k,o} = A_1\theta^{\beta_2} + \frac{\theta}{\delta} - \frac{C_k}{r}, \tag{IA12}$$

$$V^m_{k,i} = A_2\theta^{\beta_1}, \tag{IA13}$$

where A_1 and A_2 are free parameters, and:

$$\beta_1 = -(r-\delta-\sigma^2/2)/\sigma^2 + \sqrt{(r-\delta-\sigma^2/2)^2 + 2r\sigma^2}/\sigma^2, \quad \text{(IA14)}$$

$$\beta_2 = -(r-\delta-\sigma^2/2)/\sigma^2 - \sqrt{(r-\delta-\sigma^2/2)^2 + 2r\sigma^2}/\sigma^2. \quad \text{(IA15)}$$

To determine the values of the A_1 and A_2 parameters, we ensure that the values of the idle and operating factory value-match and smooth-paste at the optimal switching-on state variable threshold. Defining that threshold as $\theta^s \equiv C_k$, we thus have:

$$A_1(\theta^s)^{\beta_2} + \frac{(\theta^s)}{\delta} - \frac{C_k}{r} = A_2(\theta^s)^{\beta_1}, \quad \text{(IA16)}$$

$$\beta_2 A_1(\theta^s)^{\beta_2-1} + \frac{1}{\delta} = \beta_1 A_2(\theta^s)^{\beta_1-1}. \quad \text{(IA17)}$$

Solving Equations (IA16) and (IA17) for A_1 and A_2, we obtain:

$$A_1 = \left(\frac{r-\beta_1(r-\delta)}{r\delta(\beta_1-\beta_2)}\right) C_k^{1-\beta_2}, \quad \text{(IA18)}$$

$$A_2 = \left(\frac{r-\beta_2(r-\delta)}{r\delta(\beta_1-\beta_2)}\right) C_k^{1-\beta_1}. \quad \text{(IA19)}$$

IA.3.3. Valuing the Newly-Built Factories

We next value the newly-built factory allowing the firm to produce one output unit per time unit at an initial unit cost of C_2^t and a later unit cost of C_2 when the firm decides to switch on the factory, with the (constant) probability of the cost changing from C_2^t to C_2 equal to λdt per instant after installation of the factory. While the firm does not directly observe the initial cost C_2^t until it owns the factory, investors never find out the exact value of that cost but are able to observe when it changes from C_2^t to C_2. Before their uncertainty is resolved, the firm and investors are, however, able to learn about the initial cost using a signal, allowing them to form a posterior distribution for the natural log of that cost, $c_2^t \equiv \ln(C_2^t)$. The posterior distribution is normal, with an expectation equal to $\mu_{c_2^t}$ and variance equal to $\sigma^2_{c_2^t}$.

To find the value of the newly-built factory with uncertain C_2^t, V_2^{nb}, we start off with forming the expectation of the integral of its discounted profits under the equivalent martingale measure and then condition on the value of C_2^t inside of the expectation:

$$V_2^{nb} = E^{\mathbb{Q}}\left[\int_0^\infty e^{-rs}\pi^{nb}(s,\theta,C_2^t)ds\right] = E^{\mathbb{Q}}\left[E^{\mathbb{Q}}\left[\int_0^\infty e^{-rs}\pi^{nb}(s,\theta,C_2^t)ds|C_2^t\right]\right], \quad \text{(IA20)}$$

where the inner expectation on the right-hand side of the second equality is simply the value of a factory allowing the firm to produce one output unit at a *certain* initial unit cost of C_2^t and a later unit cost of C_2 when the firm decides to switch on the factory.[6] Denoting the value of the factory with certain production costs by $\bar{V}_2^{nb}$, it is obvious that it has to fulfill ODE (IA6) with V^a equal to V^m, the value of the mature factory (see Section IA.3.2.). In the following, we find $\bar{V}_2^{nb}$ separately for the cases (i) $C_2^t \geq C_2$ and (ii) $C_2^t < C_2$.[7]

$\mathbf{C_2^t \geq C_2}$ **Case**: When the initial production cost is higher than the later, then the firm switches on the factory both before and after it matures if the state variable value is above the initial cost (i.e., $\theta \geq C_2^t$); it only switches on the factory after but not before it matures if the state variable value lies between the two costs (i.e., $C_2^t > \theta \geq C_2$); and it never switches on the factory if the state variable value lies below the later cost (i.e., $\theta < C_2$). Denoting the values of the factories in the three cases by $\bar{V}_{2,oo}^{nb1}$, $\bar{V}_{2,io}^{nb1}$, and $\bar{V}_{2,ii}^{nb1}$, respectively, we can show that the solutions to the ODEs of the newly-built factory with certain initial costs above

[6]Notice that, in contrast to other equations, we explicitly show the dependence of the profit, $\pi(t,\theta,C_2^t)$, on time t, the output price θ, and the initial production cost C_2^t in Equation (IA20).

[7]Hull and White (1987) employ the same "trick" to find the solution for the value of a European call option under stochastic volatility when the asset value and volatility diffusions are uncorrelated.

later costs and thus its values need to be of the general form:

$$\bar{V}_{2,oo}^{nb1} = B_1\theta^{\beta_2'} + A_1\theta^{\beta_2} + \frac{\theta}{\delta} - \frac{C_2}{r} - \frac{C_2^t - C_2}{r+\lambda}, \tag{IA21}$$

$$\bar{V}_{2,io}^{nb1} = B_2\theta^{\beta_1'} + B_3\theta^{\beta_2'} + A_1\theta^{\beta_2} + \frac{\theta}{\delta} - \frac{C_2}{r} - \frac{\theta}{\delta+\lambda} + \frac{C_2}{r+\lambda}, \tag{IA22}$$

$$\bar{V}_{2,ii}^{nb1} = B_4\theta^{\beta_1'} + A_2\theta^{\beta_1}, \tag{IA23}$$

where B_1 to B_4 are free parameters, and:

$$\beta_1' = -(r-\delta-\sigma^2/2)/\sigma^2 + \sqrt{(r-\delta-\sigma^2/2)^2 + 2(r+\lambda)\sigma^2}/\sigma^2, \tag{IA24}$$

$$\beta_2' = -(r-\delta-\sigma^2/2)/\sigma^2 - \sqrt{(r-\delta-\sigma^2/2)^2 + 2(r+\lambda)\sigma^2}/\sigma^2. \tag{IA25}$$

To determine the values of the B_1 to B_4 parameters, we ensure that the values of the three component solutions value-match and smooth-paste at the appropriate state variable thresholds. Defining the upper threshold as $\theta^{s1} \equiv C_2^t$, we thus have:

$$B_1(\theta^{s1})^{\beta_2'} - \frac{C_2^t}{r+\lambda} = B_2(\theta^{s1})^{\beta_1'} + B_3(\theta^{s1})^{\beta_2'} - \frac{\theta^{s1}}{\delta+\lambda}, \tag{IA26}$$

$$\beta_2' B_1(\theta^{s1})^{\beta_2'-1} = \beta_1' B_2(\theta^{s1})^{\beta_1'-1} + \beta_2' B_3(\theta^{s1})^{\beta_2'-1} - \frac{1}{\delta+\lambda}. \tag{IA27}$$

Solving Equations (IA26) and (IA27) for $B_1 - B_3$ and B_2, we obtain:

$$B_1 - B_3 = \left(\frac{r+\lambda-\beta_1'(r-\delta)}{(\beta_1'-\beta_2')(r+\lambda)(\delta+\lambda)}\right)(C_2^t)^{1-\beta_2'}, \tag{IA28}$$

$$B_2 = \left(\frac{r+\lambda-\beta_2'(r-\delta)}{(\beta_1'-\beta_2')(r+\lambda)(\delta+\lambda)}\right)(C_2^t)^{1-\beta_1'}. \tag{IA29}$$

Defining the lower threshold as $\theta^{s2} \equiv C_2$, we equivalently have:

$$B_2(\theta^{s2})^{\beta_1'} + B_3(\theta^{s2})^{\beta_2'} - \frac{(\theta^{s2})}{\delta+\lambda} + \frac{C_2}{r+\lambda} = B_4(\theta^{s2})^{\beta_1'}, \tag{IA30}$$

$$\beta_1' B_2(\theta^{s2})^{\beta_1'-1} + \beta_2' B_3(\theta^{s2})^{\beta_2'-1} - \frac{1}{\delta+\lambda} = \beta_1' B_4(\theta^{s2})^{\beta_1'-1}, \tag{IA31}$$

where we use the fact that $A_1(\theta^{s2})^{\beta_2} + \frac{(\theta^{s2})}{\delta} - \frac{C_2}{r} = A_2(\theta^{s2})^{\beta_1}$ (see Equation (IA16)). Solving Equations (IA30) and (IA31) for B_3 and $B_2 - B_4$, we obtain:

$$B_2 - B_4 = \left(\frac{r+\lambda-\beta_2'(r-\delta)}{(\beta_1'-\beta_2')(r+\lambda)(\delta+\lambda)}\right)(C_2)^{1-\beta_1'}, \tag{IA32}$$

$$B_3 = \left(\frac{-(r+\lambda)+\beta_1'(r-\delta)}{(\beta_1'-\beta_2')(r+\lambda)(\delta+\lambda)}\right)(C_2)^{1-\beta_2'}, \tag{IA33}$$

Using Equations (IA28), (IA29), (IA32), and (IA33), we can finally calculate B_1 to B_4.

$\mathbf{C_2^t < C_2}$ **Case**: When the initial production cost is lower than the later, then the firm switches on the factory both before and after it matures if the state variable value is above the later cost (i.e., $\theta \geq C_2$); it only switches on the factory before but not after it matures if the state variable value lies between the two costs (i.e., $C_2 > \theta \geq C_2^t$); and it never switches on the factory if the state variable value lies below the initial cost (i.e., $\theta < C_2^t$). Denoting the values of the factories in the three cases by $\bar{V}_{2,oo}^{nb2}$, $\bar{V}_{2,oi}^{nb2}$, and $\bar{V}_{2,ii}^{nb2}$, respectively, we can show that the solutions to the ODEs of the newly-built factory with certain initial costs above later costs and thus its values need to be of the general form:

$$\bar{V}_{2,oo}^{nb2} = D_1\theta^{\beta_2'} + A_1\theta^{\beta_2} + \frac{\theta}{\delta} - \frac{C_2}{r} - \frac{C_2^t - C_2}{r+\lambda}, \tag{IA34}$$

$$\bar{V}_{2,oi}^{nb2} = D_2\theta^{\beta_1'} + D_3\theta^{\beta_2'} + A_2\theta^{\beta_1} + \frac{\theta}{\delta+\lambda} - \frac{C_2^t}{r+\lambda}, \tag{IA35}$$

$$\bar{V}_{2,ii}^{nb2} = D_4\theta^{\beta_1'} + A_2\theta^{\beta_1}, \tag{IA36}$$

where D_1 to D_4 are free parameters.

To determine the values of the D_1 to D_4 parameters, we ensure that the values of the three component solutions value-match and smooth-paste at the appropriate state variable thresholds. Defining the upper threshold as $\theta^{s3} \equiv C_2$, we thus have:

$$D_1(\theta^{s3})^{\beta_2'} + \frac{C_2}{r+\lambda} = D_2(\theta^{s3})^{\beta_1'} + D_3(\theta^{s3})^{\beta_2'} + \frac{(\theta^{s3})}{\delta+\lambda}, \tag{IA37}$$

$$\beta_2' D_1(\theta^{s3})^{\beta_2'-1} = \beta_1' D_2(\theta^{s3})^{\beta_1'-1} + \beta_2' D_3(\theta^{s3})^{\beta_2'-1} + \frac{1}{\delta+\lambda}, \tag{IA38}$$

where we again make use of the fact that $A_1(\theta^{s3})^{\beta_2} + \frac{(\theta^{s3})}{\delta} - \frac{C_2}{r} = A_2(\theta^{s3})^{\beta_1}$. Solving Equations (IA37) and (IA38) for $D_1 - D_3$ and D_2, we obtain:

$$D_1 - D_3 = \left(\frac{-(r+\lambda) + \beta_1'(r-\delta)}{(\beta_1' - \beta_2')(r+\lambda)(\delta+\lambda)}\right)(C_2)^{1-\beta_2'}, \tag{IA39}$$

$$D_2 = \left(\frac{-(r+\lambda) + \beta_2'(r-\delta)}{(\beta_1' - \beta_2')(r+\lambda)(\delta+\lambda)}\right)(C_2)^{1-\beta_1'}. \tag{IA40}$$

Defining the lower threshold as $\theta^{s4} \equiv C_2^t$, we equivalently have:

$$D_2(\theta^{s4})^{\beta_1'} + D_3(\theta^{s4})^{\beta_2'} + \frac{(\theta^{s4})}{\delta+\lambda} - \frac{C_2^t}{r+\lambda} = D_4(\theta^{s4})^{\beta_1'}, \tag{IA41}$$

$$\beta_1' D_2(\theta^{s4})^{\beta_1'-1} + \beta_2' D_3(\theta^{s4})^{\beta_2'-1} + \frac{1}{\delta+\lambda} = \beta_1' D_4(\theta^{s4})^{\beta_1'-1}. \tag{IA42}$$

Solving Equations (IA41) and (IA42) for $D_2 - D_4$ and D_3, we obtain:

$$D_2 - D_4 = \left(\frac{-(r+\lambda) + \beta_2'(r-\delta)}{(\beta_1' - \beta_2')(r+\lambda)(\delta+\lambda)}\right)(C_2^t)^{1-\beta_1'}, \tag{IA43}$$

$$D_3 = \left(\frac{r+\lambda - \beta_1'(r-\delta)}{(\beta_1' - \beta_2')(r+\lambda)(\delta+\lambda)}\right)(C_2^t)^{1-\beta_2'}. \tag{IA44}$$

Using Equations (IA39), (IA40), (IA43), and (IA44), we can finally calculate D_1 to D_4.

Having derived a closed-form solution for $\bar{V}_2^{nb}$, the value of the factory with certain initial and later production costs, we can now return to finding a closed-form solution for V_2^{nb}, the value of the factory with uncertain initial costs. To find the closed-form solution for V_2^{nb}, we simply need to integrate over $\bar{V}_2^{nb}$ separately for the cases (i) $\theta \geq C_2$ and (ii) $\theta < C_2$ (recall Equation (IA20)). Starting with the $\theta \geq C_2$ case, we have:

$$
\begin{aligned}
V_2^{nb} &= \int_{\ln\theta}^{+\infty} \bar{V}_{2,io}^{nb1} p(s)ds + \int_{c_2}^{\ln\theta} \bar{V}_{2,oo}^{nb1} p(s)ds + \int_{-\infty}^{c_2} \bar{V}_{2,oo}^{nb2} p(s)ds && \text{(IA45)} \\
&= P_{\{C_2^t \geq \theta\}} \left(E_1[B_2]\theta^{\beta_1'} + B_3\theta^{\beta_2'} - \frac{\theta}{\delta+\lambda} \right) + P_{\{\theta > C_2^t \geq C_2\}} \left(E_2[B_1]\theta^{\beta_2'} - \frac{E_2[C_2^t]}{r+\lambda} \right) \\
&\quad + P_{\{C_2^t < C_2\}} \left(E_3[D_1]\theta^{\beta_2'} - \frac{E_3[C_2^t]}{r+\lambda} \right) + A_1\theta^{\beta_2} + \frac{\theta}{\delta} - \frac{C_2}{r} + \frac{C_2}{r+\lambda}, && \text{(IA46)}
\end{aligned}
$$

where $p(s)$ is the normal probability density function with an expectation of $\mu_{c_2^t}$ and a variance of $\sigma_{c_2^t}^2$; $P_{\{C_2^t \geq \theta\}}$, $P_{\{\theta > C_2^t \geq C_2\}}$, and $P_{\{C_2^t < C_2\}}$ are the probabilities that the initial cost lies above the state variable value, between the state variable value and the later cost, and below the later cost, respectively; and $E_1[.]$, $E_2[.]$, and $E_3[.]$ are expectations conditional on the initial cost lying above the state variable value, between the state variable value and the later cost, and below the later cost, respectively. Turning to the $\theta < C_2$ case, we have:

$$
\begin{aligned}
V_2^{nb} &= \int_{c_2}^{+\infty} \bar{V}_{2,ii}^{nb1} p(s)ds + \int_{\ln\theta}^{c_2} \bar{V}_{2,ii}^{nb2} p(s)ds + \int_{-\infty}^{\ln\theta} \bar{V}_{2;oi}^{nb2} p(s)ds && \text{(IA47)} \\
&= P_{\{C_2^t \geq C_2\}} E_4[B_4]\theta^{\beta_1'} + P_{\{C_2 > C_2^t \geq \theta\}} E_5[D_4]\theta^{\beta_1'} \\
&\quad + P_{\{C_2^t < \theta\}} \left(D_2\theta^{\beta_1'} + E_6[D_3]\theta^{\beta_2'} + \frac{\theta}{\delta+\lambda} - \frac{E_6[C_2^t]}{r+\lambda} \right) + A_2\theta^{\beta_1}, && \text{(IA48)}
\end{aligned}
$$

where, in a similar vein as before, $P_{\{C_2^t \geq C_2\}}$, $P_{\{C_2 > C_2^t \geq \theta\}}$, and $P_{\{C_2^t < \theta\}}$ are the probabilities that the initial cost lies above the later cost, between the later cost and the state variable value, and below the state variable value, respectively; and $E_4[.]$, $E_5[.]$, and $E_6[.]$ are expectations conditional on the initial cost lying above the later cost, between the later cost and the state variable value, and below the state variable value, respectively.

Finally, since the natural log of the initial cost C_2^t is normal with an expectation equal to $\mu_{c_2^t}$ and a variance equal to $\sigma^2_{c_2^t}$, it is well known that:

$$\begin{aligned} P_{\{U>C_2^t\geq L\}} &= P\left(\frac{\ln(U)-\mu_{c_2^t}}{\sigma_{c_2^t}} > \frac{c_2^t-\mu_{c_2^t}}{\sigma_{c_2^t}} \geq \frac{\ln(L)-\mu_{c_2^t}}{\sigma_{c_2^t}}\right) && \text{(IA49)} \\ &= N\left[\frac{\ln(U)-\mu_{c_2^t}}{\sigma_{c_2^t}}\right] - N\left[\frac{\ln(L)-\mu_{c_2^t}}{\sigma_{c_2^t}}\right], && \text{(IA50)} \end{aligned}$$

where $U \geq L \geq 0$ are constants. Moreover, notice that the input argument of each conditional expectation, $E_x[.]$, takes the general form $a(C_2^t)^b$, where $a > 0$ and b are constants. Conditioning on the initial cost C_2^t lying between L and U (where $U \geq L \geq 0$ are again constants), a direct evaluation of the integral underlying the conditional expectation yields:

$$\begin{aligned} E[a(C_2^t)^b|U > C_2^t \geq L] &= e^{\ln(a)+b\mu_{c_2^t}+\frac{1}{2}b^2\sigma^2_{c_2^t}} \\ &\quad \left(\frac{N[(u-\mu_{c_2^t}-b\sigma^2_{c_2^t})/\sigma_{c_2^t}] - N[(l-\mu_{c_2^t}-b\sigma^2_{c_2^t})/\sigma_{c_2^t}]}{N[(u-\mu_{c_2^t})/\sigma_{c_2^t}] - N[(l-\mu_{c_2^t})/\sigma_{c_2^t}]}\right) && \text{(IA51)} \end{aligned}$$

where $u \equiv \ln(U)$ and $l \equiv \ln(L)$.

IA.3.4. Valuing Growth Options on the Newly-Built Factories

We next value the growth option allowing the firm to construct the newly-built factory enabling it to produce one output unit per time unit at an initial (unknown) unit cost of C_2^t and a later (fixed) cost of C_2 for an installation cost equal to I. Since the growth option is unable to transform into another asset and never pays out profits, it has to fulfill ODE (IA6) with $\lambda = 0$ and $\pi = 0$. Also, the firm's optimal policy is to exercise the growth option when the state variable value θ exceeds the constant positive threshold θ^*.

Denoting the growth option's value after and before its optimal exercise by G_2^a and G_2^b, respectively, the solutions to the ODE and thus the option's values take on the forms:

$$G_2^a = V_2^{nb} - I, \quad \text{(IA52)}$$

$$G_2^b = E\theta^{\beta_1}, \quad \text{(IA53)}$$

where E is a free parameter. To determine the values of E and θ^*, we ensure that the values of the two component solutions value-match and smooth-paste at the threshold θ^*:

$$V_2^{nb}|_{\theta=\theta^*} - I = E(\theta^*)^{\beta_1}, \quad \text{(IA54)}$$

$$\frac{\partial V_2^{nb}}{\partial \theta^*}|_{\theta=\theta^*} = \beta_1 E(\theta^*)^{\beta_1 - 1}. \quad \text{(IA55)}$$

Dividing Equation (IA54) by (IA55), we obtain:

$$\beta_1(V_2^{nb}|_{\theta=\theta^*} - I) = \frac{\partial V_2^{nb}}{\partial \theta^*}|_{\theta=\theta^*}\theta^*, \quad \text{(IA56)}$$

which we need to numerically solve for θ^*. Having determined the value of θ^*, we plug in into Equation (IA54), allowing us to calculate E as $(V_2^{nb}|_{\theta=\theta^*} - I)/(\theta^*)^{\beta_1}$.

IA.3.5. Determining the Optimal Capacity

We can determine the optimal number of factories which the firm should own from:

$$K = \sum_{k=1}^{2} \mathbb{I}_{\{\theta \geq \theta_k^*\}}, \quad \text{(IA57)}$$

where the sum is taken over all available factories $k \in \{1, 2\}$, $\mathbb{I}_{\{\theta \geq \theta_k^*\}}$ is an indicator variable equal to one if the state variable value θ is greater or equal to θ_k^* and else zero, and the subscript of θ_k^* highlights that the optimal investment threshold varies across factories. Notice that the actual number of factories owned by a firm is always greater or equal to the optimal number since the firm is unable to disinvest factories.

IA.4 Main Model Comparative Statics

In Section 3.4 of our main paper, we show that our real options model suggests that the expected return of a firm building a second factory temporarily drops, before eventually rising back toward its initial level. In this section of the Internet Appendix, we now verify that this conclusion is robust to reasonable variations in our parameter choices. To do so, we repeat the calculations in the above section of our main paper separately varying one single parameter from its basecase value whilst keeping all other parameters at their basecase values. Also, we choose the moderate level of uncertainty about the initial log production cost, $\sigma_{c_2^t} = 0.50$. We next calculate the firm's expected excess return (i) before the investment, (ii) directly after it, and (iii) long after it (i.e., when the newly-built factory has matured).

Figure IA2 offers the results from this robustness exercise, plotting the expected excess firm return on the y-axis, the three model states on the x-axis, and the values of the single varied parameter on the z-axis. We vary the expected return of the output-price replication portfolio (μ), the output price drift rate (α), the output price volatility (σ), the investment cost (I), the conversion probability (λ), and the mean difference between the initial and long-run log production costs ($\mu_{c_2^t}$) in Panels A to F, respectively. The figure corroborates that our main theoretical conclusions are largely robust to our parameter value choices. In particular, the figure reveals that while the overall level of the expected excess return is

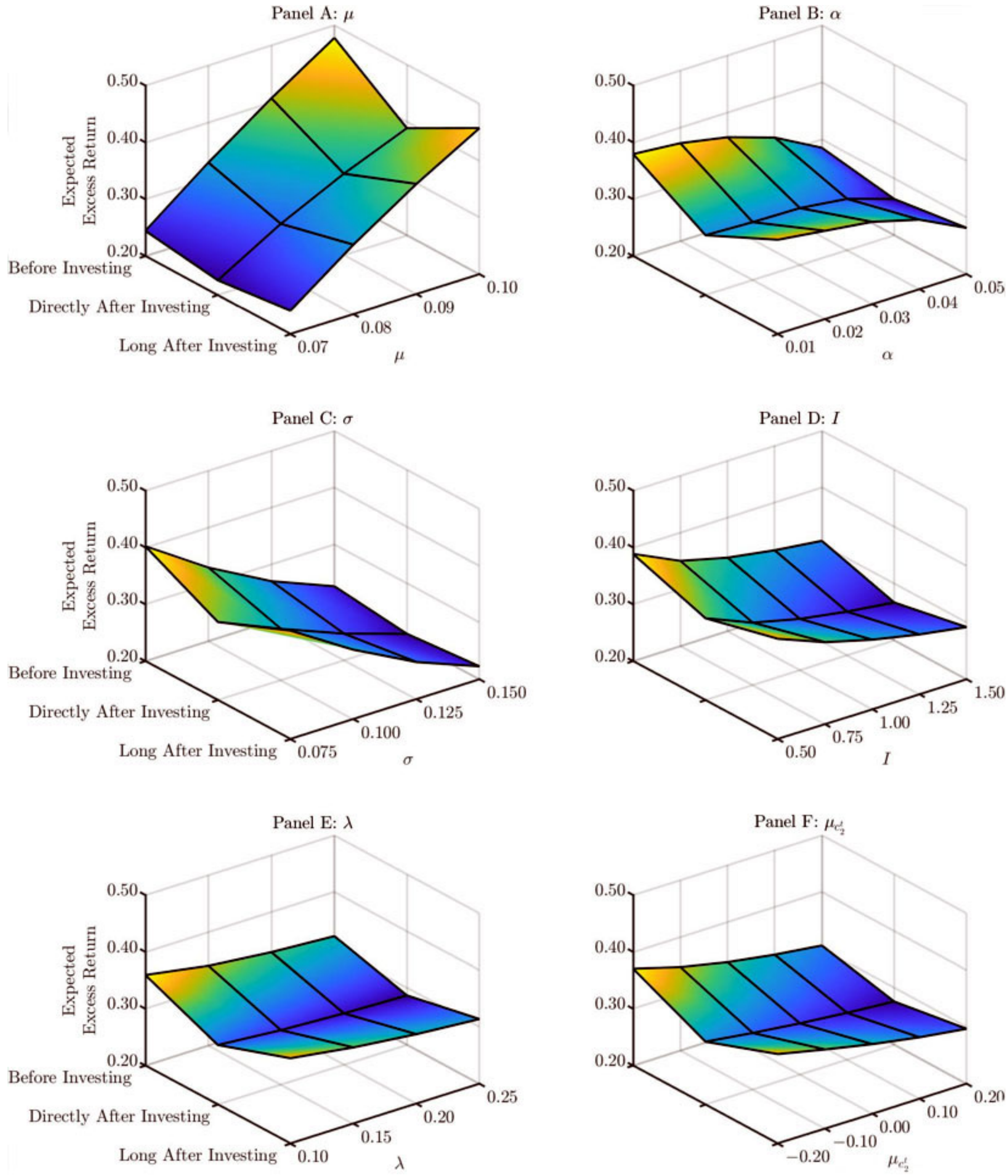

Figure IA2: Comparative Statics In this figure, we plot the expected excess return of a firm building a second factory with moderate initial production cost uncertainty ($\sigma_{c_2^t} = 0.50$, y-axis) before the investment, directly after it, and long after it (x-axis) separately varying a single parameter from its basecase value (z-axis). The single parameter is the expected return of the output price replication portfolio (μ; Panel A), the output price drift (α; Panel B), the output price volatility (σ; Panel C), the investment cost (I; Panel D), the conversion probability (λ; Panel E), and the mean difference between the initial and long run production cost ($\mu_{c_2^t}$; Panel F). We describe the basecase parameter values in Section 3.4 of our main paper.

sensitive to our parameter value choices, each choice induces the expected excess return to drop with investments but to eventually return to almost its initial level. Most noteworthily, Panel F shows that our main conclusions do not hinge on the extent to which initial production costs tend to be higher or lower than long-run costs, highlighting that our conclusions are driven by uncertainty about the initial production costs, and not their expectation.

IA.5 The Time-to-Build Extension

In this section, we look into an extended version of our main model including time-to-build. We start off with deriving the quasi-closed-form solutions for that extension. We next illustrate that time-to-build has virtually no effect on our main model conclusions.

IA.5.1. Derivations

In the real options model in our main paper, we abstract from the fact that it requires time to build a factory in the real world since other studies typically find that time-to-build has no first-order asset pricing implications in their models (see, e.g., Carlson et al. (2010)). We now establish that the same conclusion holds for the model in our main paper. To do so, we extend that model by assuming that, once a firm decides to build a factory, it takes $\bar{T}$ time units for the factory to become operational, where we can interpret $\bar{T}$ as the length of the construction period. Denoting the time at which the firm makes the building decision by t^{uc}, it is obvious that construction finishes at time $t^{uc} + \bar{T}$. While the profit of an under-construction factory is exactly zero, the factory converges to the newly-built factory without time-to-build in the model in our main paper at the end of the construction period (see Section IA.3.3.).

Following the same derivations as in Section IA.3.1.1. except for recognizing that the value of an under-construction factory, V^{uc}, must also depend on the remaining construction time

$t^{uc} + \bar{T} - t$ (so that $dV^{uc} = V_\theta^{uc} d\theta + \frac{1}{2} V_{\theta\theta}^{uc} d\theta d\theta + V_t^{uc} dt$), we can derive the partial differential equation which the value of that factory has to fulfill subject to boundary conditions:

$$\frac{1}{2}\sigma^2\theta^2 V_{\theta\theta}^{uc} + (r-\delta)\theta V_\theta^{uc} - (r+\lambda)V^{uc} + V_t^{uc} + \pi + \lambda V^a = 0. \tag{IA58}$$

Since an under-construction factory produces a profit strictly equal to zero (so that $\pi = 0$) and cannot transform into another asset before the end of the construction time (so that $\lambda = 0$), the partial differential equation in Equation (IA58) simplifies to:

$$\frac{1}{2}\sigma^2\theta^2 V_{\theta\theta}^{uc} + (r-\delta)\theta V_\theta^{uc} - rV^{uc} + V_t^{uc} = 0. \tag{IA59}$$

We next turn to the boundary conditions which the value of the under-construction factory indexed by 2 (i.e., the factory able to produce an output unit at a long-term production cost of C_2; V_2^{uc}) must fulfill. Letting the output price θ rise to infinity, the firm knows for certain that it will obtain a factory whose long-term production costs, C_2, are below the output price at the end of the construction period, so that the value of the under-construction factory is $V_2^{nb}(\theta \geq C_2)$ in Equation (IA46) discounted to the present at the upper boundary. Letting the output price drop to zero, the firm knows for certain that it will obtain a worthless factory at the end of the construction period, so that the value of the under-construction factory is zero at the lower boundary. Finally, letting $t^{uc} + \bar{T} - t$ converge to zero, the firm obtains the newly-built factory, so that the value of the under-construction factory is:

$$V_2^{uc} = \begin{cases} P_{\{C_2^t \geq \theta\}} \left(E_1[B_2]\theta^{\beta_1'} + B_3\theta^{\beta_2'} - \frac{\theta}{\delta+\lambda} \right) + P_{\{\theta > C_2^t \geq C_2\}} \left(E_2[B_1]\theta^{\beta_2'} - \frac{E_2[C_2^t]}{r+\lambda} \right) & \\ +P_{\{C_2^t < C_2\}} \left(E_3[D_1]\theta^{\beta_2'} - \frac{E_3[C_2^t]}{r+\lambda} \right) + A_1\theta^{\beta_2} + \frac{\theta}{\delta} - \frac{C_2}{r} + \frac{C_2}{r+\lambda} & \text{if } \theta \geq C_2, \\ P_{\{C_2^t \geq C_2\}} E_4[B_4]\theta^{\beta_1'} + P_{\{C_2 > C_2^t \geq \theta\}} E_5[D_4]\theta^{\beta_1'} & \\ +P_{\{C_2^t < \theta\}} \left(D_2\theta^{\beta_1'} + E_6[D_3]\theta^{\beta_2'} + \frac{\theta}{\delta+\lambda} - \frac{E_6[C_2^t]}{r+\lambda} \right) + A_2\theta^{\beta_1} & \text{if } \theta < C_2 \end{cases}$$

at the right boundary (see Equations (IA46) and (IA48)).

To obtain a solution for the value of the above under-construction factory, V_2^{uc}, we denote the remaining construction time by $\tau \equiv t^{uc} + \bar{T} - t$ and introduce the auxiliary functions $\delta_1(n) = r - (r-\delta)n - \frac{1}{2}\sigma^2 n(n-1)$ and $\delta_2(n) = \delta - \sigma^2(n-1)$. We next observe that the following two functions satisfy the partial differential equation in Equation (IA59):

$$\Theta_1(n) = \theta^n e^{-\delta_1(n)\tau} N\left[\frac{\ln\left(\frac{\theta e^{-\delta_2(n)\tau}}{C_2}\right) + (r+\frac{1}{2}\sigma^2)\tau}{\sigma\sqrt{\tau}}\right] \tag{IA60}$$

and

$$\Theta_2(n) = \theta^n e^{-\delta_1(n)\tau} N\left[-\frac{\ln\left(\frac{\theta e^{-\delta_2(n)\tau}}{C_2}\right) + (r+\frac{1}{2}\sigma^2)\tau}{\sigma\sqrt{\tau}}\right], \tag{IA61}$$

where n is an arbitrary constant. We finally note that scaled versions of $\Theta_1(n)$ and $\Theta_2(n)$ (e.g., $s\Theta_1(n)$, where s is an arbitrary constant) also fulfill that partial differential equation.

Using the definitions and functions defined above, we can write the value of the under-construction factory indexed by 2 and with remaining construction time τ as:

$$V_2^{uc} = V_{2;1}^{uc} + V_{2;2}^{uc}, \tag{IA62}$$

where:

$$\begin{aligned} V_{2;1}^{uc} \;=\; & P_{\{C_2^t \geq \theta\}} E_1[B_2]\Theta_1(\beta_1') + \Big(P_{\{C_2^t \geq \theta\}} B_3 + P_{\{\theta > C_2^t \geq C_2\}} E_2[B_1] \\ & + P_{\{C_2^t < C_2\}} E_3[D_1]\Big)\Theta_1(\beta_2') + A_1\Theta_1(\beta_2) - \left(P_{\{C_2^t \geq \theta\}}\frac{1}{\delta+\lambda} - \frac{1}{\delta}\right)\Theta_1(1) \\ & - \left(P_{\{\theta > C_2^t \geq C_2\}}\frac{E_2[C_2^t]}{r+\lambda} + P_{\{C_2^t < C_2\}}\frac{E_3[C_2^t]}{r+\lambda} + \frac{C_2}{r} - \frac{C_2}{r+\lambda}\right)\Theta_1(0) \end{aligned} \tag{IA63}$$

and

$$V_{2;2}^{uc} = \left(P_{\{C_2^t \geq C_2\}} E_4[B_4] + P_{\{C_2 > C_2^t \geq \theta\}} E_5[D_4] + P_{\{C_2^t < \theta\}} D_2\right) \Theta_2(\beta_1') + P_{\{C_2^t < \theta\}} E_6[D_3] \Theta_2(\beta_2')$$
$$+ A_2 \Theta_2(\beta_1) + P_{\{C_2^t < \theta\}} \frac{1}{\delta + \lambda} \Theta_2(1) - P_{\{C_2^t < \theta\}} \frac{E_6[C_2^t]}{r + \lambda} \Theta_2(0). \quad \text{(IA64)}$$

We next look into the growth option to acquire the under-construction factory indexed by 2 and with a remaining construction time equal to $\bar{T}$, $\hat{G}_2$. Toward that goal, we first recognize that this growth option has to fulfill the same ODE as the growth option in the model in our main paper (i.e., Equation (IA6) with $\pi = \lambda = 0$). As a result, the option's value after ($\hat{G}_2^a$) and before ($\hat{G}_2^b$) its optimal exercise are again of the forms:

$$\hat{G}_2^a = V_2^{uc} - I, \quad \text{(IA65)}$$
$$\hat{G}_2^b = \hat{E} \theta^{\beta_1}, \quad \text{(IA66)}$$

where $\hat{E}$ is a free parameter. To find the values of $\hat{E}$ and $\hat{\theta}^*$ (the investment-triggering output price threshold for the under-construction factory), we ensure that the values of the two component solutions once again value-match and smooth-paste at the threshold $\hat{\theta}^*$:

$$V_2^{uc}|_{\theta = \hat{\theta}^*} - I = \hat{E} (\hat{\theta}^*)^{\beta_1}, \quad \text{(IA67)}$$
$$\frac{\partial V_2^{uc}}{\partial \hat{\theta}^*}|_{\theta = \hat{\theta}^*} = \beta_1 \hat{E} (\hat{\theta}^*)^{\beta_1 - 1}. \quad \text{(IA68)}$$

Dividing Equation (IA67) by (IA68), we obtain:

$$\beta_1 (V_2^{uc}|_{\theta = \hat{\theta}^*} - I) = \frac{\partial V_2^{uc}}{\partial \hat{\theta}^*}|_{\theta = \hat{\theta}^*} \hat{\theta}^*, \quad \text{(IA69)}$$

which we need to numerically solve for $\hat{\theta}^*$. Having done so, we are then able to plug $\hat{\theta}^*$ into Equation (IA67), rearrange that equation, and back out the value of $\hat{E}$.

IA.5.2. The Effect of Time-to-Build

We next explore whether our model extension featuring time-to-build yields different effects of real investment on the firm's expected excess return relative to our main model in Section 3 of our main paper. To that end, we redo the calculations in Section 3.4.2 of our main paper based on the model extension, setting the time to build the second factory, $\bar{T}$, to zero (for comparison),[8] 0.25, 0.50, 1.00, and 2.00. Conversely, we set all other parameters to the same values as in Section 3.4. We then again raise the output price from 0.01 below ("Before Investing") the second factory's optimal investment-triggering output-price threshold, $\hat{\theta}_2^*$, to 0.01 above ("Directly After Investing" and "Long After Investing") it, separately contrasting the cases in which the decision to build the factory has just been made ("Directly After Investing") and in which that factory has already matured ("Long After Investing").

Table IA.5 reports the results from those calculations, with Panels A and B assuming a moderate ($\sigma_{c_2^t} = 0.50$) or high (1.00) initial production cost uncertainty, respectively. While the columns of the table assume different time-to-build values, the rows within each panel show the firm's expected excess return before investing, directly after investing, and long after investing. The table confirms that time-to-build only marginally influences the response of the expected excess return to real investments. Looking, for example, into the high cost uncertainty case, Panel B demonstrates that the initial expected excess return is always between 0.39 and 0.42 (see first row), while that same expected return directly after investing is always between 0.31 and 0.32 (see second row). Conversely, the long-after-investing expected excess return is always between 0.38 and 0.40 in the final row. We find similarly small variations relative to our main model in the moderate uncertainty case in Panel A.

[8] Note that the model extension collapses to our main model when time-to-build is equal to zero.

IA.6 Robustness of Our Additional Evidence

In this section, we demonstrate that our additional results supporting our uncertainty explanation for our main empirical evidence are robust to our choice of the pre-construction, post-construction, and long-post-construction windows. To do so, Internet Appendix Table IA.6 starts off with showing the results from repeating panel regression (9) in our main paper of a firm's profit growth on an interaction between its industry's mean output-price-growth and a dummy variable indicating whether the firm reports positive PPE-CIP expenses over some subsequent period, some prior period, and some longer-ago prior period, the main effects, controls, and firm and time fixed effects. In contrast to our main paper, we now however use alternative definitions for the three periods. To be more specific, Panel A (B) [C] now considers the one (three) [five] years after, the one (three) [five] years before, and the one (three) [five] years before the prior one (three) [five]. We include Panel B for comparison with our main results. While the table uses the same conventions as its counterpart in the main paper (i.e., Table 5), it omits the control variable effects for the sake of brevity.

The table corroborates that the profit growth panel regression results are robust to the choice of the three construction windows. While column (1) shows that firms with newly-built capacity always have a statistically similar profit sensitivity to their industry's mean output price relative to their peers before the capacity's installation, column (2) reveals that their sensitivities always become significantly lower directly after (contrast Panels A to C). In each case, columns (3) and (4) clarify that the lower sensitivities mostly come from bad industry states (contrast the same panels). Finally, columns (5) and (6) confirm that the sensitivities of firms with newly-built capacity always converge back to those of their peers as we move away from the capacity's installation date (see Panels A to C). In fact, the columns suggest that the effect of newly-built capacity is weaker the deeper in the past the long-post-construction window is, in line with the idea that the effect slowly tapers off over time.

In Internet Appendix Table IA.7, we next report the results from repeating panel regression (11) in our main paper of the absolute analyst forecast error on dummy variables indicating whether the firm reports positive PPE-CIP expenses over some subsequent period, some prior period, and some longer-ago prior period, controls, and firm and time fixed effects. Just like before, we now however use the alternative definitions for the three periods also applied in our robustness profit growth regressions. The table again uses the same conventions as its counterpart in the main paper (i.e., Table 6) and omits the control variable effects.

The table demonstrates that our absolute analyst forecast error panel regressions are also robust to the choice of the three construction windows. While column (1) shows that analysts never struggle more with predicting the earnings of firms with newly-built capacity relative to those of their peers before the capacity's installation, column (2) reveals that they always do so directly after (compare Panels A to C). Just like before, however, column (3) indicates that analysts' ability to predict the earnings of firms with newly-built capacity always rises back toward their ability to predict those of other firms the further we move away from the capacity's installation date (compare the same panels). Interestingly, the column again shows that the difference between the two types of firms gradually fads over time.

IA.7 Refuting Alternative Hypotheses

In this section, we finally refute several alternative explanations for our main empirical result that constructing stocks are behind the investment anomaly. The first alternative explanation is that investments into building capacity may be larger than others, implying that constructing firms convert a greater amount of high-risk growth options into low-risk assets-in-place than their counterparts. In turn, the larger investments produce stronger expected return drops.[9] A second alternative explanation is that investments into building capacity could be more often financed by overvalued equity (or, alternatively, debt) than others, inducing the market values of constructing firms to fall as investors become aware of the mispricing and correct it (see, e.g., Agrawal and Jaffe (2000) and Baker et al. (2003)). Spurred by anecdotal evidence, a third alternative explanation is that many construction projects go over-budget, inducing the market values of constructing stocks to fall as investors become aware of unexpected construction costs. A final alternative explanation is that constructing stocks could be smaller than others, leading investments to more negatively affect their mean future returns since the investment anomaly is stronger for smaller stocks (Fama and French (2008)).

We use simple comparisons of firm fundamentals across constructing and non-constructing stocks over the investment year and the subsequent five to shed some light on the alternative explanations. To do so, we start from the sample of firm-fiscal year observations included in the asset pricing tests in Section 2 of our main paper. We extract from that sample all those observations with an *Investment* value within the top decile and then split them according to whether *DummyConstruction* is equal to zero or one, retaining, however, only observations with non-missing data for the current fiscal year and the subsequent five. For each subsample and fiscal year, we then calculate the mean value of some firm fundamental for the current year and the subsequent five, before averaging over our sample period. We finally also calculate the change from the investment year to five years later ("5–0") and the difference across constructing and non-constructing firms for each of the six years ("(1)–(2)").

Table IA.8 presents the results from the univariate comparisons. While plain numbers are mean estimates or the differences in them, those in square brackets are Newey-West (1987)

[9] We notice that the first alternative explanation suffers from the same problem as other standard real options explanations. To be more specific, it cannot account for the stylized fact that the effect of investments on future stock returns only persists for a relatively small number of years.

t-statistics with a six-month lag length. As firm characteristics, we look into *Investment*, *Book-ToMarket*, total equity financing, total debt financing, *Profitability*, and *MarketSize* in Panels A to F, respectively.[10] While we measure *Investment* over the current fiscal year, we measure all others over the prior. The table does not suggest that constructing firms convert a greater amount of high-risk growth options into low-risk assets-in-place than other firms. To be more specific, Panel A reveals that, if anything at all, constructing stocks produce smaller PPE changes than other firms. Even if these PPE changes were a distorted proxy for investments into additional productive capacity, Panel B indicates that constructing firms hold a similar amount of growth options (as measured through the book-to-market ratio) as others before their investments, and that the decline in that amount in the investment year is similar across constructing and non-constructing firms (see the spread between rows (1) and (2)).[11]

Panels C and D of Table IA.8 also refute the conjecture that the investments of constructing firms are more often financed through overvalued equity or debt than those of other firms, showing that equity as well as debt financing is similar across constructing and non-constructing firms in the pre-investment year and the subsequent five. In the same vein, Panel E renders it unlikely that constructing firms suffer from significant unexpected construction costs. While constructing firms may not be required to immediately expense these costs, we find no evidence that such costs make constructing firms less profitable than their counterparts over the five years after their investments. Finally, Panel F suggests that constructing stocks share a similar market size with non-constructing stocks, refuting the hypothesis that our main empirical evidence is simply due to the investment anomaly being stronger for smaller stocks.[12]

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[10]See Table A.1 in Appendix A of our main paper for more details about the construction of those variables also used in our main empirical tests in our main paper. See the caption of Table IA.8 for more details about the construction of the total equity and debt financing variables (see also Cooper et al. (2008)).

[11]In line with some literature, we interpret the book-to-market ratio as the fraction of stock value attributable to assets-in-place. In accordance, an increase in the book-to-market ratio indicates that a firm exercises some of its growth options, converting them into additional assets-in-place.

[12]We also looked into other firm fundamentals, including *MarketBeta*, financial leverage, operating leverage

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Table IA.1
FM Regressions Using Alternative Screens and Proxies
The table presents the investment premium estimates from full-sample (row (1)) and subsample ((2) and (3)) Fama-MacBeth (1973) regressions of stock returns over month t on investment and controls measured until the start of that month using alternative sample screens and proxies. The subsample regressions in rows (2) and (3) are separately run on firms with a positive and zero *Construction* value, respectively. Row (2)–(3) reports the difference in estimates across the subsamples. In column (1), we exclude observations with missing *Construction* values from our sample. In column (2), we select as constructing firms those with a positive PPE-CIP balance at the start and/or end of the fiscal year ending in calendar year $t-1$. In column (3), we retain service firms. In column (4) ((5)), we retain firms with sales below \$25 million over the fiscal year ending in calendar year $t-1$ (remove stocks with a price below \$5 (but not those with a market capitalization below the first quartile) at the end of June of calendar year t), over the period from start-July of calendar year t to end-June of calendar year $t+1$. In column (6), we use delevered returns as dependent variable. We use the same controls as in Table 3 in our main paper. The plain numbers are the monthly investment premium estimates or their difference, stated in percent. The numbers in square brackets are Newey and West (1987) t-statistics with a six-month lag length. See Table A.1 in the appendix of our main paper for more details about variable definitions.

	Exclude Missing Cons. Obs.	Use Two-Year Cons. Average	Retain Service Firmes	Retain Firms With Sales Below \$25m	Swap Market Cap For Price Filter	Unlevered Stock Returns
	(1)	(2)	(3)	(4)	(5)	(6)
Full Sample (1)	−1.90	−1.19	−1.34	−1.35	−0.90	−0.68
	[−5.81]	[−3.23]	[−4.01]	[−3.81]	[−2.57]	[−3.05]
Cons. Stocks (2)	−2.51	−2.46	−2.11	−2.58	−1.93	−1.57
	[−6.94]	[−6.70]	[−6.36]	[−7.45]	[−5.49]	[−6.33]
Non-Cons. Stocks (3)	−0.82	−0.62	−1.02	−0.80	−0.45	−0.31
	[−1.56]	[−1.56]	[−2.53]	[−2.04]	[−1.19]	[−1.35]
Difference (2)–(3)	−1.69	−1.84	−1.09	−1.77	−1.48	−1.26
	[−2.86]	[−3.99]	[−2.27]	[−3.81]	[−3.26]	[−4.36]

Table IA.2
WLS Regressions of Stock Returns on Investment Interacted with Construction
The table presents the results from weighted-least squares (WLS) Fama-MacBeth (1973) regressions of stock returns over month t on combinations of investment, construction, and controls measured until the start of that month. In Panels A and B, we weight each cross-sectional observation by market size at the end of month $t-1$ or by the gross return over that same month. In columns (1) to (3), we report the results from full-sample regressions on, respectively, *Investment* and the controls; *Investment*, an interaction between *Investment* and *Construction*, *Construction*, and the controls; and *Investment*, an interaction between *Investment* and a *Construction* rank variable, the rank variable, and the controls. In columns (4) and (5), we report the results from subsample regressions run separately on firms with a positive and zero *Construction* value, respectively. Column (4)–(5) finally reports the difference in estimates across the subsamples. The plain numbers are monthly premium estimates, in percent. The numbers in square brackets are Newey and West (1987) t-statistics with a six-month lag length. See Table A.1 in the appendix of our main paper for more details about variable definitions.

	Full Sample	Full Sample	Full Sample	Cons. Subsample	Zero Cons. Subsample	Spread Between Subsamples
	(1)	(2)	(3)	(4)	(5)	(4)–(5)
Panel A: Using Past Market Size As Weight						
Investment (I)	−0.80	−0.49	−0.49	−1.98	−0.35	−1.63
	[−2.35]	[−1.28]	[−1.21]	[−3.63]	[−0.98]	[−2.59]
I× Construction		−28.51				
		[−2.37]				
Construction		2.54				
		[1.69]				
I× RankConstruction			−2.15			
			[−2.19]			
RankConstruction			0.22			
			[2.64]			
MarketBeta	−0.04	−0.03	−0.03	−0.16	0.03	−0.19
	[−0.16]	[−0.12]	[−0.10]	[−0.53]	[0.12]	[−1.25]
MarketSize	−0.06	−0.06	−0.06	−0.06	−0.06	0.01
	[−1.18]	[−1.26]	[−1.26]	[−1.11]	[−1.26]	[0.25]
BookToMarket	0.12	0.11	0.12	−0.05	0.21	−0.26
	[1.29]	[1.19]	[1.26]	[−0.46]	[2.18]	[−2.86]
Momentum	0.60	0.58	0.59	0.43	0.71	−0.28
	[2.08]	[2.04]	[2.08]	[1.49]	[2.33]	[−1.59]
Profitability	0.40	0.40	0.40	−0.12	0.66	−0.78
	[2.05]	[2.10]	[2.08]	[−0.44]	[2.98]	[−2.66]
Constant	1.11	1.09	1.08	1.31	1.02	0.29
	[2.31]	[2.29]	[2.27]	[2.70]	[2.05]	[1.03]

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Table IA.2
WLS Regressions of Stock Returns on Investment Interacted with Construction (cont.)

	Full Sample	Full Sample	Full Sample	Cons. Subsample	Zero Cons. Subsample	Spread Between Subsamples
	(1)	(2)	(3)	(4)	(5)	(4)–(5)
			Panel B: Using Past Gross Return As Weight			
Investment (I)	−1.12	−0.77	−0.72	−2.39	−0.54	−1.85
	[−3.04]	[−1.86]	[−1.63]	[−6.48]	[−1.36]	[−3.88]
I× Construction		−22.07				
		[−2.51]				
Construction		0.65				
		[0.44]				
I× RankConstruction			−2.50			
			[−3.07]			
RankConstruction			0.20			
			[2.01]			
MarketBeta	−0.01	−0.01	−0.01	0.02	−0.01	0.03
	[−0.05]	[−0.04]	[−0.03]	[0.11]	[−0.04]	[0.31]
MarketSize	−0.02	−0.03	−0.03	−0.07	−0.01	−0.05
	[−0.53]	[−0.57]	[−0.64]	[−1.45]	[−0.29]	[−2.21]
BookToMarket	0.24	0.24	0.24	0.14	0.28	−0.14
	[2.74]	[2.68]	[2.69]	[1.16]	[3.30]	[−1.57]
Momentum	1.04	1.04	1.04	0.96	1.10	−0.15
	[4.87]	[4.84]	[4.88]	[3.94]	[5.24]	[−1.04]
Profitability	0.69	0.69	0.69	0.63	0.70	−0.07
	[2.93]	[2.92]	[2.94]	[2.10]	[3.01]	[−0.31]
Constant	0.82	0.82	0.81	1.09	0.74	0.35
	[1.83]	[1.84]	[1.84]	[2.51]	[1.61]	[1.86]

Table IA.3
FM Regressions Using Alternative Investment Proxies

The table presents the investment premium estimates from full-sample (row (1)) and subsample ((2) and (3)) Fama-MacBeth (1973) regressions of stock returns over month t on investment and controls measured until the start of that month using alternative investment proxies. The subsample regressions in rows (2) and (3) are separately run on firms with a positive and zero *Construction* value, respectively. Row (2)–(3) reports the difference in estimates across the subsamples. In columns (1) to (4), we use the ratio of CAPEX to gross property, plant, and equipment; the ratio of CAPEX to sales over its moving average taken over the prior three years; the percentage growth in total productive capacity; and the percentage growth in total assets, respectively. We use the same controls as in Table 3. The plain numbers are the monthly investment premium estimates or their difference across the subsamples, stated in percent. The numbers in square brackets are Newey and West (1987) t-statistics with a six-month lag length. See Table A.1 in the appendix of our main paper for more details about variable definitions.

	CAPEX-to-PPE	Abnormal CAPEX	Capital Growth	Asset Growth
	(1)	(2)	(3)	(4)
Full Sample (1)	−0.83	−0.13	−0.55	−0.56
	[−4.42]	[−4.52]	[−5.40]	[−6.37]
Cons. Stocks (2)	−1.32	−0.19	−0.83	−0.73
	[−4.66]	[−4.37]	[−5.92]	[−5.24]
Non-Cons. Stocks (3)	−0.61	−0.10	−0.45	−0.51
	[−3.26]	[−2.67]	[−4.06]	[−5.75]
Difference (2)–(3)	−0.71	−0.10	−0.38	−0.23
	[−2.72]	[−1.78]	[−2.64]	[−1.74]

Table IA.4
Spanning Tests of the Fama-French (2015) CMA Factor

The table presents the results from time-series regressions of the Fama-French (2015) CMA factor over month t on combinations of a concurrent version of that factor formed from constructing stocks (*DummyConstruction*=1; "Cons. CMA"), a concurrent version formed from non-constructing stocks (*DummyConstruction*=0; "Non-Cons. CMA"), and a constant. Plain numbers are monthly estimates (in percent), while those in square brackets are Newey and West (1987) t-statistics with a six-month lag length.

	Fama-French (2015) CMA			
	(1)	(2)	(3)	(4)
Constant	0.26	0.04	0.07	0.00
	[2.55]	[0.77]	[2.30]	[−0.02]
Cons. CMA		0.60		0.31
		[14.54]		[12.30]
Non-Cons. CMA			0.93	0.72
			[22.82]	[46.79]

Table IA.5

The Effect of Time-to-Build on the Investment-Expected Firm Return Relation

The table presents the effect of real investments on the firm's expected excess return when the firm builds a second factory with either a moderate (Panel A) or high (Panel B) initial production cost uncertainty in the model extension with time-to-build. We set time-to-build to zero (for comparison), 0.25, 0.50, 1.00, and 2.00 in columns (1) to (5), respectively. For each initial cost uncertainty ($\sigma_{c_2^t}$)-time-to-build ($\bar{T}$) combination, we raise the output price from 0.01 below ("Before Investing") the second factory's optimal investment-triggering output-price threshold, θ_2^*, to 0.01 above ("Directly After Investing" and "Long After Investing") it. Also, we either assume that the newly-built factory operates at its initial ("Directly After Investing") or its long-run ("Long after Investing") production costs. The table entries are expected excess returns. We describe the basecase parameter values in Section 3.4 of our main paper. In Panels A and B, we set the initial production cost uncertainty parameter, $\sigma_{c_2^t}$, to 0.50 and 1.00, respectively.

	Time-to-Build				
	0.00	0.25	0.50	1.00	2.00
	(1)	(2)	(3)	(4)	(5)
Panel A: Building with Moderate Cost Uncertainty ($\sigma_{c_2^t} = 0.50$)					
Before Investing	0.33	0.33	0.33	0.32	0.32
Directly After Investing	0.29	0.29	0.29	0.28	0.28
Long After Investing	0.32	0.32	0.32	0.32	0.32
Panel B: Building with High Cost Uncertainty ($\sigma_{c_2^t} = 1.00$)					
Before Investing	0.42	0.42	0.41	0.41	0.39
Directly After Investing	0.32	0.32	0.32	0.32	0.31
Long After Investing	0.40	0.40	0.40	0.39	0.38

Table IA.6
Profit Regressions Using Alternative Construction Windows
The table presents the results from panel regressions of a firm's profit growth over quarter t on its industry's mean-output-price growth over that quarter, output price growth interacted with a dummy variable equal to one if the firm engages in construction work over the following X year(s) (*PreConstruction*), the previous X year(s) (*PostConstruction*), or the X years before the previous X year(s) (*LongPostConstruction*) and else zero, controls, and firm and time fixed effects. We set X equal to one, three, and five in Panels A, B, and C, respectively. While columns (1) and (2) show the results from full-sample regressions, columns (3) to (6) show those from subsample regressions on observations with a past X-year mean-output-price growth above ((3) and (5)) and below ((4) and (6)) the median. Plain numbers are estimates, while the numbers in square brackets are White (1980) t-statistics. For the sake of brevity, the table does not report the control effects. See Tables A.1 and A.3 in Appendix A of our main paper for variable and industry definitions, respectively.

			Subsamples			
	Full	Full	Price Growth		Price Growth	
	Sample	Sample	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: One-Year Construction Windows						
Δ *OutputPrice* (Δ *OP*)	0.39	0.38	0.32	0.47	0.36	0.39
	[7.82]	[8.01]	[4.28]	[7.11]	[4.76]	[5.91]
Δ *OP* $\times$ *PreConstruction*	−0.20					
	[−0.81]					
Δ *OP* $\times$ *PostConstruction*		−0.23	−0.15	−0.35		
		[−3.66]	[−1.52]	[−4.00]		
Δ *OP* $\times$ *LongPostConstruction*					−0.19	−0.24
					[−1.82]	[−2.69]
Panel B: Three-Year Construction Windows (Repeated for Convenience)						
Δ *OutputPrice* (Δ *OP*)	0.39	0.40	0.38	0.46	0.31	0.18
	[7.47]	[8.33]	[4.91]	[6.80]	[3.80]	[2.37]
Δ *OP* $\times$ *PreConstruction*	0.02					
	[0.09]					
Δ *OP* $\times$ *PostConstruction*		−0.23	−0.15	−0.34		
		[−3.62]	[−1.48]	[−3.76]		
Δ *OP* $\times$ *LongPostConstruction*					−0.09	−0.25
					[−0.83]	[−1.96]

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Table IA.6
Profit Regressions Using Alternative Construction Windows (cont.)

			Subsamples			
	Full	Full	Price Growth		Price Growth	
	Sample	Sample	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)
Panel C: Five-Year Construction Windows						
Δ*OutputPrice* (Δ*OP*)	0.41	0.41	0.39	0.48	0.31	0.42
	[7.66]	[8.37]	[4.84]	[6.99]	[3.50]	[5.72]
$\Delta OP \times PreConstruction$	0.06					
	[0.33]					
$\Delta OP \times PostConstruction$		−0.23	−0.12	−0.35		
		[−3.45]	[−1.13]	[−3.86]		
$\Delta OP \times LongPostConstruction$					−0.10	−0.19
					[−0.82]	[−1.85]

Table IA.7
Absolute Forecast Error Regressions Using Alternative Construction Windows
The table presents the results from panel regressions of a firm's absolute analyst earnings-forecast error scaled by realized earnings on a dummy variable equal to one if the firm engages in construction work over the following X years (*PreConstruction*), the prior X (*PostConstruction*), or the X-year period before the prior X years (*LongPostConstruction*) and else zero, controls, and firm and time fixed effects. We set X equal to one, three, and five in Panels A, B, and C, respectively. Plain numbers are coefficient estimates, while the numbers in square brackets are White (1980) t-statistics. For the sake of brevity, the table does not report the control effects. See Table A.1 in Appendix A of our main paper for variable definitions.

	(1)	(2)	(3)
Panel A: One-Year Construction Windows			
PreConstruction	0.01		
	[0.41]		
PostConstruction		0.03	
		[3.30]	
LongPostConstruction			0.02
			[2.42]
Panel B: Three-Year Construction Windows (Repeated For Convenience)			
PreConstruction	0.02		
	[1.42]		
PostConstruction		0.04	
		[4.07]	
LongPostConstruction			0.03
			[3.18]
Panel C: Five-Year Construction Windows			
PreConstruction	0.02		
	[1.33]		
PostConstruction		0.04	
		[3.84]	
LongPostConstruction			0.02
			[1.85]

Table IA.8
Comparing Fundamentals Across Constructing and Non-Constructing Stocks
The table compares firm characteristics across high-investment constructing and non-constructing firms over their investment year and the subsequent five. We select as high-investment firms those with an *Investment* value above the last decile at the end of each fiscal year t in our sample period. We next split those firms into constructing and non-constructing firms according to whether *DummyConstruction*=0 or 1 at that time, respectively. The fundamentals are investment intensity over the current year (*Investment*; Panel A), the prior-year book-to-market ratio (*BookToMarket*; Panel B), equity (Panel C) and debt (Panel D) financing over the prior year, total profitability over the prior year (*Profitability*; Panel E), and the prior-year market size (*MarketSize*; Panel F). Excluding firms with incomplete data over the six-year period, we first calculate mean values by constructing (row (1)) and non-constructing (row (2)) firm and year (columns (1) to (6)). We then average over our sample period. Row (1)–(2) reports the difference across constructing and non-constructing firms by year, while column (7) reports the change in the mean values over the six years by subsample. Plain numbers are mean estimates or their differences, while those in square brackets are Newey-West (1987) t-statistics with a six-month lag length. See Table A.1 in Appendix A of our main paper for more details about the definitions of those variables also used in our main paper. Equity financing is the change in preferred stock (pstk) plus common equity (ceq) plus minority interest (mib) minus retained earnings (re) over the fiscal year ending in calendar year $t-1$ scaled by total assets (at) at the start of that year. Debt financing is the change in total current liabilities (dlc) over the fiscal year ending in calendar year $t-1$ scaled by total assets (at) at the start of that year.

	Year Relative to Investment Year						Difference	
	0	+1	+2	+3	+4	+5	+5–0	t-stat.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Panel A: Investment Intensity					
Cons. Stocks (1)	0.20	0.12	0.10	0.09	0.08	0.07	−0.14	[−8.20]
Non-Cons. Stocks (2)	0.24	0.15	0.13	0.12	0.12	0.10	−0.14	[−8.57]
Difference (1)–(2)	−0.04	−0.03	−0.04	−0.03	−0.04	−0.03		
t-statistic	[−3.29]	[−3.39]	[−3.30]	[−2.49]	[−3.35]	[−4.24]		
			Panel B: Prior-Year Book-to-Market					
Cons. Stocks (1)	0.57	0.62	0.66	0.67	0.67	0.68	0.11	[1.83]
Non-Cons. Stocks (2)	0.59	0.64	0.66	0.67	0.69	0.69	0.11	[2.18]
Difference (1)–(2)	−0.02	−0.02	−0.01	0.00	−0.02	−0.02		
t-statistic	[−0.52]	[−0.72]	[−0.19]	[−0.19]	[−0.63]	[−0.42]		

(continued on next page)

Table IA.8
Comparing Fundamentals Across Constructing and Non-Constructing Stocks (cont.)

	Year Relative to Investment Year						Difference	
	0	+1	+2	+3	+4	+5	+5–0	*t*-stat.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel C: Prior-Year Equity Financing								
Cons. Stocks (1)	0.11	0.05	0.03	0.03	0.02	0.02	−0.09	[−3.53]
Non-Cons. Stocks (2)	0.11	0.06	0.04	0.04	0.04	0.03	−0.08	[−4.44]
Difference (1)–(2)	0.00	−0.01	−0.01	−0.02	−0.02	−0.01		
t-statistic	[−0.32]	[−1.61]	[−3.48]	[−3.28]	[−3.68]	[−3.98]		
Panel D: Prior-Year Debt Financing								
Cons. Stocks (1)	0.01	0.00	0.00	0.00	0.00	0.00	−0.01	[−3.32]
Non-Cons. Stocks (2)	0.01	0.01	0.00	0.00	0.00	0.00	−0.01	[−3.41]
Difference (1)–(2)	0.00	0.00	0.00	0.00	0.00	0.00		
t-statistic	[−0.16]	[−1.32]	[0.37]	[−0.49]	[−0.57]	[0.56]		
Panel E: Prior-Year Profitability								
Cons. Stocks (1)	0.30	0.30	0.28	0.27	0.28	0.30	0.00	[−0.05]
Non-Cons. Stocks (2)	0.29	0.28	0.27	0.28	0.27	0.28	−0.02	[−0.91]
Difference (1)–(2)	0.00	0.02	0.01	0.00	0.01	0.02		
t-statistic	[0.34]	[1.57]	[0.96]	[−0.47]	[0.62]	[0.97]		
Panel F: Prior-Year Market Size								
Cons. Stocks (1)	3.50	3.67	4.00	4.40	4.69	5.12	1.62	[2.35]
Non-Cons. Stocks (2)	4.96	5.47	5.62	6.18	6.50	6.77	1.82	[4.42]
Difference (1)–(2)	−1.46	−1.80	−1.62	−1.78	−1.81	−1.66		
t-statistic	[−1.42]	[−1.64]	[−1.51]	[−1.59]	[−1.55]	[−1.46]		