M&A in the US Video Game Industry: Assessing Theories of Vertical Integration

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Introduction

- What determines firm boundaries and their consequences are central questions in economics (AND management AND strategy) ever since Coase (1937)
  - TCE (Williamson, 1975-1985) vs PRT (G-H-M, 1986-1990-1995)
  - Lafontaine and Slade (2007), Macher and Richman (2008) recent reviews in literature
  - Yet … clear evidence on PRT is hard to come by: Woodruff (2002), Fresard et al (2015)

- Innovative, creative industries challenge well-established literature (Gil and Spiller, CMR 2007)
  - Ederer and Manso (2013), Charness and Grieco (2015) beyond the scope of this paper

- M&A in creative industries seem an appropriate scenario to test the role of PRT in determining firm boundaries
  - "Assets" (resources and capabilities) in creative industries are difficult/impossible to replicate across firm boundaries … non-contractible investments
  - PRT inherently dynamic notion of firm boundaries determination

Our paper today

- To what extent PRT & TCE theories of vertical integration can explain patterns of M&A in the US video game industry between 2000 and 2007?

- Simple model of integration departing from Whinston (2003) a la PRT extended into revealed-preference model of M&A when allow model parameters to change over time

- NPD data: monthly sales for universe of 3,382 games between 2000-2007 (6^{th} and 7^{th} generation)
  - Collection by-hand of information on vertical structure by video game
  - Information on takeovers, mergers and acquisitions
  - Collapse data to firm and game level

- Empirical Strategy:
  - Ex-post consequences of acquisition
  - Determinants of acquisitions
    - First, who are the acquirers and the acquired?
    - Second, what determines the matches between acquirers and acquired?

Introduction

- Our contribution is best represented in reference to Spiller's "On Vertical Mergers" in 1985 JLEO (29 vertical mergers in several different industries)
  - Our data 58 vertical mergers in the same industry, acquired firms are small private companies

- Spiller (1985) presents two main alternatives to explain why firms merge or acquire others
  - Acquiring market power to eliminate price externalities (Spengler) or exploit synergies (Chandler, Arrow, Carlton or Stigler)
  - Limiting opportunistic behavior and incentivize investment in specific assets (Williamson, KCA)

- Innovative, creative industries may deemphasize previous explanations … and add two new reasons to the existing list
  - Attracting and retaining new talent
  - Acquiring IP … and future game franchise rights

Outline of Rest of Presentation

- Institutional description + arms' length contracting in US video games
- Model (PRT + "dynamic" + matching)
- Testable predictions/implications
- Data description (2000 to 2007)
- Taking testable predictions to data,
  - Ex-post acquisition prediction (PRT)
  - Stylized Facts: who are the acquirers and who are the acquired? (PRT + TCE)
  - What defines the match? (TCE)
- Conclusion

Institutional details

- This paper is about the video game industry, final good: video game + console
  - Only in the US: $9.5 billion in 2007, 11.7 billion in 2008, and 25.1 billion in 2010
  - In June 2011, the global video game market was valued at USD 65 billion

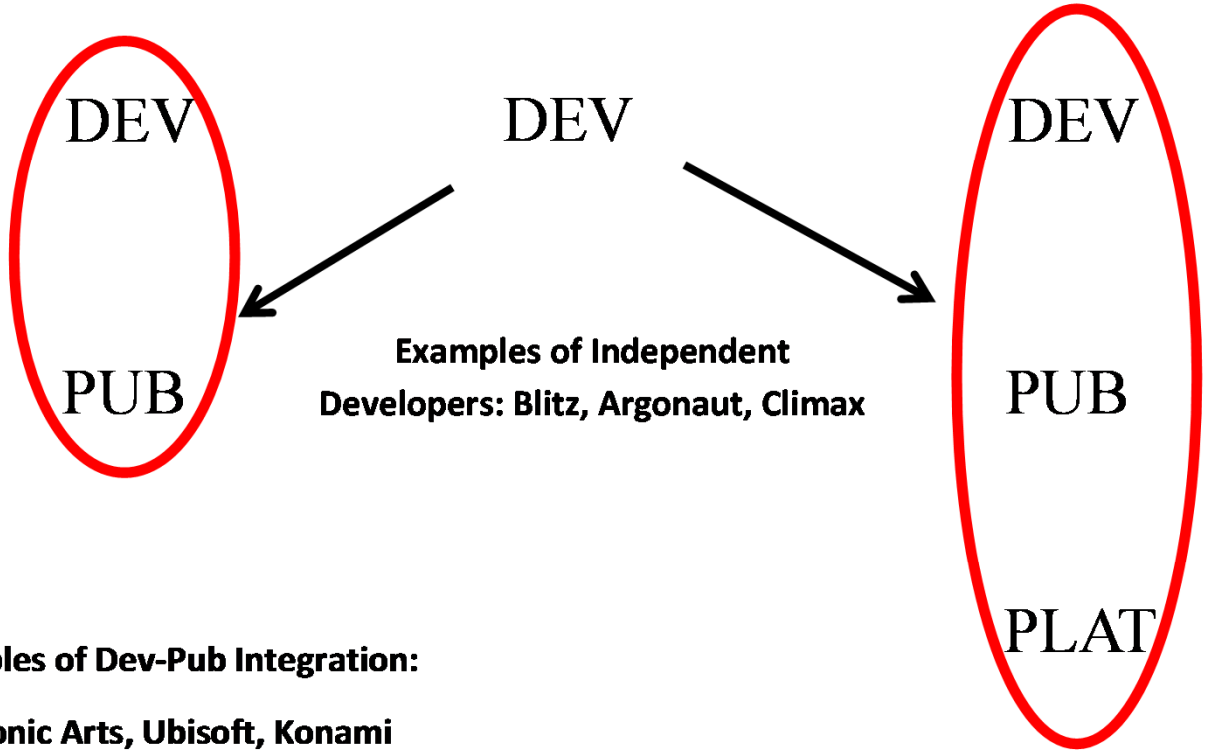
- Industry has three big players/console manufacturers,
  - Nintendo, Gamecube and Wii
  - Microsoft, Xbox and Xbox 360
  - Sony, PS2 and PS3

- Every 5 to 7 years, new generation of consoles
  - In 2000, 6^{th} generation … in 2005, 7^{th} generation

- Historically (Atari experience) console manufacturers (and publishers) face trade-off
  - Control stock (number and quality) of games
  - Network/portfolio effects

- Seasonality and time since release are as important as in other media and entertainment industries

Organization Structures & Vertical Relationships between Developers and Publishers in Sample



Examples of Independent Developers: Blitz, Argonaut, Climax

Examples of Dev-Pub Integration:

Electronic Arts, Ubisoft, Konami

Examples of Publishers Owning Platform: Microsoft, Sony, Nintendo

Institutional details (continued …)

- Development contracts specify milestone payments and royalties to be paid by the publisher to the developer
  - Royalties may be paid after milestone payments are recouped
  - Lump sum in advance and completion bonus … if milestones and deadlines are met
- Game testing requires coordination between developer and publisher … testing equipment supplied by platform
  - As game complexity grew, publishers took over (previously by developer)
  - QA teams and project managers control/supervise developers work
  - Gains of in-house development highest when need of coordination is highest
- Publisher pays royalties to platforms
- Independent game developers consider trade-offs of exclusivity
  - More potential sales if sold in multiple platforms
  - Less favorable contractual terms

A Model of M&A

- From Whinston (2003), we model interaction between publisher *p* and developer *d* where both parties own and manage an asset.

- The object of the exercise is to study the optimal organizational for $A_p=\{0,1\}$ where 0 = [*d* and *p* contract at arms' length], and 1 = [publisher owns developer, integrated]

- We focus on non-contractible investments i_d and i_p as contractible investment are assumed away as in Whinston (2003) such that profits from trade are

$$\pi(i_d,i_p) = \alpha_0+\alpha_p i_p+\alpha_d i_d+\alpha_1\theta_p+\alpha_2\theta_d+\alpha_3\mu_{pd}$$

and the value of outside options for p and d are

$$w_p(i_p,i_d)=\beta_o+\beta_p i_p+\beta_d i_d+\theta_p+\mu_p$$
$$w_d(i_p,i_d)=\gamma_o+\gamma_p i_p+\gamma_d i_d+\theta_d+\mu_d$$
$$\mu_{pd} = \mu_p + \mu_d$$

and private cost of non-contractible effort such that $C_j(i_j)=(1/2)(i_j)^2$ where $j = d, p$.

A Model of M&A (continued)

- Note that the outside options are assumed the same regardless of organizational form A_p.

- Following Grossman and Hart (1986) and Whinston (2003), for $A_p = 0$, *d* and *p* split the net gains of trade at 50%, while publisher keeps all for $A_p = 1$.

- For the time being, trade is ex-post efficient such that $\alpha_p > \beta_p \geq 0$ and $\alpha_d > \gamma_d \geq 0$

- Let us skip FB … then move onto SB with different organizational forms and the first implication is that $i^1_p > i^0_p$ and $i^0_d > i^1_d$ if $(1/2)(\alpha_d - \beta_d) > (1/2)\gamma_d$ and $\alpha_p - \gamma_p > \beta_p$.

- Our first proposition/prediction/testable implication comes straight from this result:

After acquisition, we should observe a decrease in developer's effort and performance. In our empirical setting, this means that developers after acquisition they will develop games that collect lower revenues than prior to acquisition.

A Model of M&A (continued)

- Until now we were implicitly holding constant the match between d and p and evaluating how each party's behavior will change under different organizational forms A_p.

- From a static point of view, integration is preferred to contracting as long as

$$(\alpha_p-(\beta_p-\gamma_p))^2+(\beta_d-(\gamma_d-\alpha_d))^2>(\gamma_d-\alpha_d)^2+\alpha_d^2+4\gamma_p^2+3\gamma_d^2$$

  consistent with Whinston (2003) in that integration is preferred organizational form the higher α_p, β_d and the lower γ_d. All other coefficients have ambiguous effects.

- From a "dynamic" point of view, we focus on two main ways in which firm boundaries are reshaped over time:
  - *d* and *p* were contracting with each other in period t, and *p* acquires *d* in *t+1*
  - *d* and *p* were NOT contracting with each other in period t, and *p* acquires *d* in *t+1*

[Bringing "Dynamics" Into] a Model of M&A

- Let us first consider the case when "*d* and *p* were contracting with each other in period t-1, and *p* acquires *d* in *t"*

- It must be true then that

$$V^1(i^1_{pt},i^1_{dt})>V^0(i^0_{pt},i^0_{dt}) \text{ AND } V^0(i^0_{pt-1},i^0_{dt-1})>V^1(i^1_{pt-1},i^1_{pt-1})$$

- This basically boils down to (under our specification of $V_{ij} = \pi_{ij} - C_i - C_j$) that the change in α_d over time (expectation of the marginal benefits to the non-contractible effort of the developer) must be large enough to compensate for the relative loss in effort and its cost.

- A second proposition/prediction/testable implication emerges from this,

When two parties d and p are contracting with each other in the past, p acquires d only if there is new information regarding the importance of non-contractible effort of d. In our empirical setting means that the publisher learns something new about the developer through developer's game performance.

[Bringing "Dynamics" Into] a Model of M&A

- Let us now consider the case when "*d* and *p* were NOT contracting with each other in period t-1, and *p* acquires *d* in *t"*

- It must be true then that

$$V^1(i^1_{pt},i^1_{dt})>V^0(i^0_{pt},i^0_{dt}) \text{ AND } V^0(i^0_{pt-1},i^0_{d't-1})>V^0(i^0_{pt-1},i^0_{dt-1})$$

- This is far more complicated than before and this scenario would be the combination of changes in α_d over time as well as the quality of the match (TCE plays a role here, at least more than before)

- A third proposition/prediction/testable implication emerges from this,

When two parties d and p have NOT contracted with each other in the past, p acquires d only if there is new information regarding the importance of non-contractible effort of d AND new information regarding the value of the match. In our empirical setting means that the publisher learns something new about the quality of the match that has nothing to do with developer's game performance.

Two Main Sets of Predictions

- Post-Acquisition Impact
  - Due to incentive loss (PRT), developer performance will go down after acquisition …
    - … relative to its own performance
    - … relative to other non-acquired independent developers
    - … relative to other previously acquired/integrated development divisions

- Determinants of Acquisitions (demand, supply and match)
  - More likely when learning occurs through a HIT game when there is no technology change (due to learning) and parties have contracted in the past: PRT
  - More likely to occur regardless of HIT game when there is technology change … because learning of new match value: PRT & TCE
  - Easier measurement and lower transaction costs … more likely when both firms are geographically close and publicly listed: TCE
  - More experience … easier measurement: TCE
  - Strategic acquisitions: number of games, number of genres, quality of game, sequel potential: TCE & PRT

Data description

- Monthly video game sales information between Oct 2000 – Oct 2007 from NPD
  - Universe of 3,382 games for 6th and 7th generation
    - 6th generation: Nintendo Gamecube, Xbox, PS2
    - 7th generation: Wii, Xbox 360, PS3
  - Also information on revenues (and therefore average prices per month) as well as platform, game and publisher information (no developer info)
  - Throw away observations with unreasonable prices (<$5 and >$60) & after a year of release

- Complement information with data from Gil and Warzynski (2014) and new data
  - Developer info per game at release (from different websites)
  - Takeovers, acquisitions and mergers between 2000 and 2007
  - Checked, coded and matched by hand all this info with newspapers and multiple sources
  - NEW data here: HQ location, whether publicly traded, foundation year

- Collapse data at the firm level (developer and publisher) … empirical analysis takes place at the firm and developer-publisher match level
  - Gil & Warzysnki (2014) at the video game level
  - Most literature on video games at the platform level

M&A, PRIOR CONTACT AND YEAR OF ACQUISITION

	PRIOR CONTACT		
M&A	**NO**	**YES**	**TOTAL**
NO	48,325	892	49,217
YES	12	46	58
TOTAL	48,337	938	49,275

SAMPLE OF ACQUISITIONS

	PRIOR CONTACT		
	NO	**YES**	**TOTAL**
2000-03	1	17	18
2004-07	11	29	40
TOTAL	12	46	58

Tabulations of potential matches between developers and publishers, prior contact and year of M&A.

M&A, HIT, PRIOR CONTACT AND YEAR OF ACQUISITION

	PRIOR CONTACT		
HIT	**NO**	**YES**	**TOTAL**
NO	9	22	31
YES	3	24	27
TOTAL	12	46	58

	HIT		
YEARS	**NO**	**YES**	**TOTAL**
2000-03	4	14	18
2004-07	27	13	40
TOTAL	31	27	58

M&A, HIT, PRIOR CONTACT BY YEAR OF ACQUISITION

YEARS 2000-2003

	PRIOR CONTACT		
HIT	**NO**	**YES**	**TOTAL**
NO	0	4	4
YES	1	13	14
TOTAL	1	17	18

YEARS 2004-2007

	PRIOR CONTACT		
HIT	**NO**	**YES**	**TOTAL**
NO	9	18	27
YES	2	11	13
TOTAL	11	29	40

Post-Acquisition Performance

"Due to incentive loss (PRT), developer performance will go down after acquisition"

We run following specification,

$$log(cum\ sales_{idt,t+10}) = \alpha_0 + \alpha_1 AfterAcquistion_{dt} + \theta_m + \theta_{pla} + \theta_{genre} + u_{dt}$$

using no control group (within estimate), and relative to other non-acquired independent developers and to other previously acquired/integrated development divisions.

We also break the sample into 2000-2003 & 2004-2007 period because potentially differences in motives of acquisitions between these two periods.

Before-After & Diff-in-Diff Performance Measured by 10-Month Accumulation of Games Developed Post-Acquistion

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep Var:	**log[cumulative 10-month sales**								
After Acquisition?	-0.395**	-0.953***	-1.448***	-0.315**	-0.733**	-1.209***	-0.220	-0.736**	-1.147***
	(0.022)	(0.006)	0.000	(0.042)	(0.024)	0.000	(0.123)	(0.025)	0.000
Constant	15.149***	17.835***	16.378***	14.617***	14.859***	14.205***	14.844***	14.832***	15.441***
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Platform FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Genre FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Group	None	None	None	Independent	Independent	Independent	Integrated	Integrated	Integrated
Years	All	2000-03	2004-07	All	2000-03	2004-07	All	2000-03	2004-07
Observations	431	202	229	1,540	648	892	1,667	792	875
R-squared	0.62	0.813	0.727	0.627	0.746	0.752	0.589	0.7	0.65

Robust pval in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Stylized Facts

How acquiring publishers differ from those that do not acquire developers? How do acquired developers differ from those that remain independent?

Simple OLS regressions may uncover some of the factors that increase willingness to pay for asset control and determinants of supply in the US video game industry.

We run the following specifications,

$$AcquiringPublisher_j = \alpha_0 + \alpha_1 X_j + u_j$$

and

$$AcquiredDeveloper_i = \alpha_0 + \alpha_1 X_i + u_i$$

using as control group those publishers that did not acquire any developers and those non-acquired independent developers.

We also break the sample into 2000-2003 & 2004-2007 period because potentially differences in motives of acquisitions between these two periods.

LP Model of Probability a Publisher Acquires any Developer & No Acquisitions

	(1)	(2)	(3)	(4)	(5)	(6)
Dep Var:	**Publisher Acquires a Developer?**					**No Acquisitions**
# Games	0.003***				0.001	0.011*
	(0.002)				(0.402)	(0.075)
% Internal Games	-0.310				-0.213	-1.255
	(0.495)				(0.566)	(0.391)
Genres/Games	-0.262*				-0.152	0.205
	(0.078)				(0.183)	(0.601)
% Internal Genres	0.397				0.167	-0.522
	(0.340)				(0.593)	(0.749)
HQ North-America		-0.067			-0.087	0.289
		(0.570)			(0.403)	(0.468)
HQ UK		0.089			0.121	0.091
		(0.504)			(0.420)	(0.710)
HQ Asia		-0.119			-0.105	-0.235
		(0.258)			(0.279)	(0.495)
Year Creation		-0.002			0.000	-0.004
		(0.244)			(0.881)	(0.418)
Public Listed		0.451***			0.202**	0.284
		0.000			(0.039)	(0.243)
Hit Game			0.835***		0.516**	1.971**
			0.000		(0.023)	(0.025)
# Platforms				0.615***	0.141	-0.539
				0.000	(0.322)	(0.485)
Internal Development?				0.357***	0.023	0.723
				0.000	(0.802)	(0.112)
Constant	0.213*	4.989	0.094**	0.028	0.604	7.012
	(0.088)	(0.230)	(0.013)	(0.323)	(0.835)	(0.446)
Observations	78	76	78	78	76	76
R-squared	0.48	0.35	0.56	0.29	0.66	0.65

Robust pval in parentheses. *** p<0.01, ** p<0.05, *p<0.1.

LP Model of Probability a Publisher Acquires any Developer By Time Period

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dep Var:	**Publisher Acquires a Developer?**									
# Games	0.003***				0.002***	0.003***				0.001
	0.000				(0.001)	(0.002)				(0.333)
% Internal Games	-0.218				-0.258	-0.244				-0.308
	(0.353)				(0.315)	(0.577)				(0.441)
Genres/Games	0.034				0.115	-0.256*				-0.160
	(0.608)				(0.121)	(0.080)				(0.169)
% Internal Genres	0.062				-0.090	0.327				0.313
	(0.779)				(0.716)	(0.411)				(0.386)
HQ North-America		0.010			0.000		-0.095			-0.108
		(0.914)			(0.997)		(0.414)			(0.296)
HQ UK		-0.046			-0.038		0.081			0.108
		(0.614)			(0.573)		(0.559)			(0.461)
HQ Asia		-0.150*			-0.066		-0.105			-0.076
		(0.076)			(0.367)		(0.312)			(0.440)
Year Creation		-0.002			0.000		-0.002			-0.001
		(0.424)			(0.887)		(0.277)			(0.517)
Public Listed		0.228***			0.060		0.415***			0.173*
		(0.009)			(0.330)		0.000			(0.081)
Hit Game			0.484***		0.273			0.763***		0.487**
			(0.001)		(0.101)			0.000		(0.032)
# Platforms				0.154	-0.057				0.282	-0.246
				(0.590)	(0.864)				(0.332)	(0.423)
Internal Development?				0.179***	0.146**				0.357***	-0.015
				(0.005)	(0.049)				0.000	(0.874)
Constant	-0.010	3.175	0.016	0.0000001***	0.367	0.203*	4.661	0.094**	0.028	2.343
	(0.855)	(0.418)	(0.323)	(0.000)	(0.909)	(0.098)	(0.260)	(0.013)	(0.323)	(0.479)
Time Period	2000-03	2000-03	2000-03	2000-03	2000-03	2004-07	2004-07	2004-07	2004-07	2004-07
Observations	78	76	78	78	76	78	76	78	78	76
R-squared	0.43	0.19	0.38	0.11	0.51	0.47	0.33	0.48	0.22	0.61

Robust pval in parentheses. *** p<0.01, ** p<0.05, *p<0.1.

LP Model of Probability a Developer Being Acquired

	(1)	(2)	(3)	(4)
Dep Var:	**Developer Acquired?**			
Hit Game?	0.139**			0.116**
	(0.011)			(0.030)
Sequel Potential?	0.006			0.008
	(0.429)			(0.378)
Portfolio 2 to 9 Games?	-0.009			-0.011
	(0.271)			(0.219)
Portfolio 10+ Games?	-0.023			-0.044*
	(0.226)			(0.061)
US HQ?		0.023*		0.022*
		(0.055)		(0.068)
UK HQ?		0.002		0.001
		(0.882)		(0.904)
Japan HQ?		-0.022**		-0.023**
		(0.022)		-0.016
Public Listed?		0.089***		0.089***
		0.000		0.000
Year Creation		-0.001		-0.001
		(0.240)		(0.177)
Exclusive Publisher			0.002	0.012
			(0.794)	(0.200)
6th G Platform?			0.009	-0.003
			(0.283)	(0.762)
7th G Platform?			0.005	0.016
			(0.789)	(0.460)
Constant	0.102	1.500	0.105	1.816
	(0.150)	(0.232)	(0.141)	(0.174)
Year FE	Yes	Yes	Yes	Yes
Observations	2,183	1,949	2,183	1,949
R-squared	0.03	0.062	0.012	0.077

Robust pval in parentheses. *** p<0.01, ** p<0.05, * p<0.1

LP Model of Probability a Developer Being Acquired By Time Period

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep Var:	**Developer Acquired?**							
Hit Game?	0.279**			0.259**	0.086*			0.058
	(0.020)			(0.014)	(0.084)			(0.226)
Sequel Potential?	0.003			0.013	0.005			0.004
	(0.876)			(0.521)	(0.488)			(0.669)
Portfolio 2 to 9 Games?	-0.018			-0.015	-0.008			-0.016*
	(0.438)			(0.556)	(0.291)			(0.068)
Portfolio 10+ Games?	-0.018			-0.007	-0.022			-0.054***
	(0.799)			(0.930)	(0.111)			(0.003)
US HQ?		0.060*		0.054*		0.006		0.006
		(0.058)		(0.079)		(0.596)		(0.589)
UK HQ?		-0.017		-0.017		0.010		0.010
		(0.515)		(0.543)		(0.424)		(0.437)
Japan HQ?		-0.029		-0.041		-0.017*		-0.015*
		(0.237)		(0.101)		(0.068)		(0.095)
Public Listed?		0.119***		0.116***		0.072***		0.073***
		(0.002)		(0.002)		0.000		0.000
Year Creation		-0.003*		-0.003*		0.000		0.000
		(0.096)		(0.080)		(0.847)		(0.622)
Exclusive Publisher			0.024	0.049**			-0.006	-0.006
			(0.221)	(0.023)			(0.318)	(0.521)
6th G Platform?			0.028	-0.010			0.001	-0.002
			(0.212)	(0.658)			(0.910)	(0.801)
7th G Platform?							0.005	0.019
							(0.774)	(0.380)
Constant	0.105	5.493*	0.098	5.679*	0.016*	0.204	0.025**	0.562
	(0.145)	(0.097)	(0.179)	(0.082)	(0.063)	(0.840)	(0.013)	(0.614)
Time Period	2000-03	2000-03	2000-03	2000-03	2004-07	2004-07	2004-07	2004-07
YEAR FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	599	536	599	536	1,580	1,409	1,580	1,409
R-squared	0.05	0.09	0.01	0.14	0.02	0.05	0.01	0.06

Robust pval in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Do Complementarities Drive Acquisitions?

Here we want to ask whether match-specific values can explain acquisitions in the data.

For that reason, we follow the spirit of Fox (2006), Hortacsu et al. (2015) …We introduce developer and publisher fixed effects and interactions between developer and publisher characteristics. We run the following specification,

$$Match_{ij} = \alpha_0 + \alpha_1 X_i * X_j + \theta_i + \theta_j + u_{ij}$$

We also break the sample into 2000-2003 & 2004-2007 period because potentially differences in match value appear in these two periods.

Complementarities Explaining Matches Between Publishers and Developers

	(1)	(2)	(3)	(4)	(5)
Dep Var:	**Pub I Acquires Dev j?**				
Both Had Hit Games?	0.017**				0.006
	(2.148)				(0.938)
Highest Game Rev D/ Highest Game Rev P	-0.000003				-0.000002
	(-1.245)				(-0.732)
Specialization DP			0.001		0.00003
			(0.821)		(0.035)
Games D*Specialization P			0.0003		-0.0001
			(0.901)		(-0.489)
Games D/Games P			-0.0001		0.0001
			(-0.686)		(0.818)
Genres D/Genres P			-0.001		-0.0002
			(-1.590)		(-0.400)
Prior Contact		-0.032*			-0.040*
		(-1.852)			(-1.944)
Exclusive Prior Contact		0.056***			0.0320*
		(3.296)			(1.890)
Platform*Prior Contact		0.023***			0.026***
		(3.608)			(3.329)
HQ Same Continent				0.001**	0.0004
				(2.369)	(0.744)
Both Public Listed				0.004***	0.007***
				(3.630)	(3.556)
First Year D/First Year P				-0.0002	-0.001
				(-0.341)	(-0.846)
Constant	0.000002	-0.001**	-0.001	-0.001**	-0.001
	(0.011)	(-2.477)	(-1.632)	(-2.269)	(-0.981)
Publisher FE	Yes	Yes	Yes	Yes	Yes
Developer FE	Yes	Yes	Yes	Yes	Yes
Observations	34,656	42,484	34,656	44,550	31,425
R-squared	0.02	0.07	0.02	0.02	0.06

Robust pval in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Complementarities Explaining Matches Between Publishers and Developers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dep Var:	**Pub I Acquires Dev j?**									
Both Had Hit Games?	0.008				0.006	0.010				0.002
	(1.601)				(1.424)	(1.508)				(0.330)
Highest Game Rev D/ Highest Game Rev P	-0.000001				-0.0000002	-0.000003				-0.000002
	(-0.447)				(-0.0933)	(-1.262)				(-0.968)
Specialization DP			-0.0001		-0.0003			0.001		0.0003
			(-0.271)		(-0.703)			(1.112)		(0.448)
Games D*Specialization P			0.0002		0.0001			0.00003		-0.0002
			(1.402)		(0.796)			(0.114)		(-0.890)
Games D/Games P			-0.0001		-0.00001			-0.0001		0.0002
			(-1.052)		(-0.0640)			(-0.283)		(0.899)
Genres D/Genres P			0.0001		0.0003			-0.001**		-0.0005
			(0.355)		(0.987)			(-2.025)		(-1.031)
Prior Contact		-0.018*			-0.013		-0.017			-0.031
		(-1.697)			(-1.239)		(-1.159)			(-1.631)
Exclusive Prior Contact		0.029***			0.005		0.028**			0.029*
		(2.618)			(0.821)		(2.096)			(1.749)
Platform*Prior Contact		0.010**			0.008*		0.015***			0.020***
		(2.385)			(1.820)		(2.738)			(2.778)
HQ Same Continent				0.0003	0.0003**				0.001*	0.0001
				(1.323)	(1.973)				(1.948)	(0.160)
Both Public Listed				0.001*	0.001*				0.003***	0.006***
				(1.688)	(1.858)				(3.263)	(3.065)
First Year D/First Year P				0.0002	0.0002				-0.0003	-0.001
				(0.939)	(0.585)				(-0.588)	(-1.019)
Constant	0.0000004	-0.0003*	-0.0004	-0.001	-0.001	0.000002	-0.001**	-0.001	-0.001*	-0.001
	(0.005)	(-1.782)	(-0.962)	(-1.610)	(-1.179)	(0.010)	(-2.212)	(-1.384)	(-1.710)	(-0.573)
Publisher FE	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Developer FE	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Time Period	2000-03	2000-03	2000-03	2000-03	2000-03	2004-07	2004-07	2004-07	2004-07	2004-07
Observations	34,656	42,484	34,656	44,550	31,425	34,124	41,116	34,124	43,200	30,900
R-squared	0.02	0.04	0.02	0.02	0.04	0.02	0.05	0.02	0.02	0.05

Robust pval in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Discussion of Results

- Developers decreased performance post-acquisition
  - Robust across periods and definition of control group
  - This is part of the explicit costs of vertical integration in Grossman and Hart (1986)
  - Great thing about the data is that we can "Fisher Brothers after being bought by GM"
  - Result + non-contractible nature of effort = evidence in support of PRT
- Likelihood of becoming an acquirer and being acquired
  - Hit game (+), portfolio size (-), location (+/-), publicly listed (+) increase probability developer is acquired
    - Hit game matters in 2000-2003, but it does not in 2004-2007
  - Portfolio size (+), publicly listed (+), hit game (+) increase probability publisher is acquirer
    - Portfolio size matter in 2000-2003, but it does not in 2004-2007
- What drives match value?
  - Both have hit games increasing probability of match, TCE and PRT.
  - Publicly listed and colocation are good candidates for TCE evidence
  - Exclusivity & prior contact, number of platforms & prior contact increase value … TCE
  - Almost no changes across periods … supporting evidence on TCE

Conclusions

- Despite growing empirical evidence on vertical integration, little evidence in support of PRT … and not much in bringing combined evidence of PRT and TCE
- M&A in US video games seems a good setting to examine the empirical relevance to these two (main) theories of vertical integration
  - Assets and effort is highly non-contractible
  - M&A has dynamic change in boundaries of the firm (inherent to PRT more than TCE)
  - Some developers acquired by publishers that have contracted in the past, others did not
  - Two periods: stable generation & transition between generations … changes in generation of match value may drive acquisitions up for PRT and TCE reasons
  - Paper uses 2x2 matrix to provide intuition for the difference between these two theories in explaining patters in vertical integration
- Future work
  - Other drivers do not seem to explain match: IP rights, concurring outsourcing, RBV
  - Improve specifications
  - Matching estimators a la Fox (2006)