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Investing in EU Biotech IP - What Works?



Medtrack



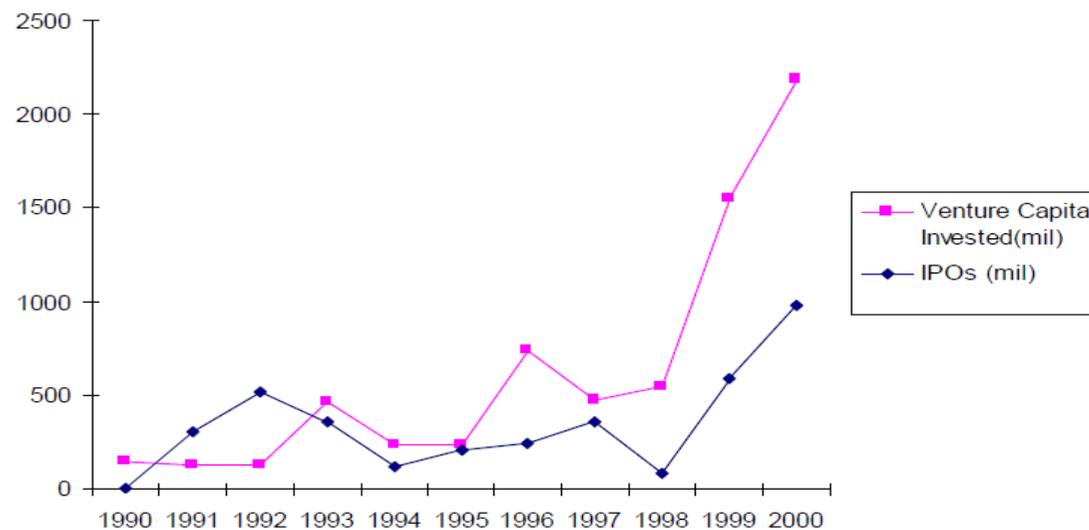
@BSBHbyVT

IP supports an ecosystem where investors are willing to lose everything 92% of the time, in order to fund the 8% of medicines that succeed.

Last Year at Gastein, We Presented This Study

Radu Munteanu, UCSD, 2010 The biotechnology cluster in San Diego
“An analysis of Initial Public Offering (IPO) activity
and probability of success for firms 1990- 2000”

- NIH \$449 mil, primarily rewarded to the Scripps Research Institute and UCSD
- IPO \$1 bil, VC \$2.4 bil = \$3.4 bil



San Diego Study Findings

- Statistically, the most important predictor of success in a biotech firm in San Diego was the size of the IPO (money gained by listing on the stock market)
- NIH (Government) funding to the university supporting a spin out was a negative indicator, but not statistically significant
- We were asked by many in attendance to replicate this research for EU biotech

The Study Methodology

- Analyse all EU Biotech Start-ups from the period of 2001 – 2007 through September 21, 2018 in the UK, Netherlands, Belgium, and Spain
- Only companies developing medicinal products for human consumption to be included, not diagnostics, devices, cosmetics, or agricultural bio.
- Compare the impact of IPOs, Private Investors, and direct EU funding on the success or failure of the company

Defining a Successful Company

Success Criteria

- Going concern, continued operation moving through clinical research
- Funding rounds/partnerships related to a successful Phase 1 or Phase 2 result of research
- Success in hitting research targets, often in EU collaborations or private licensing agreements
- Company or assets acquired with value increase (sold at a premium)

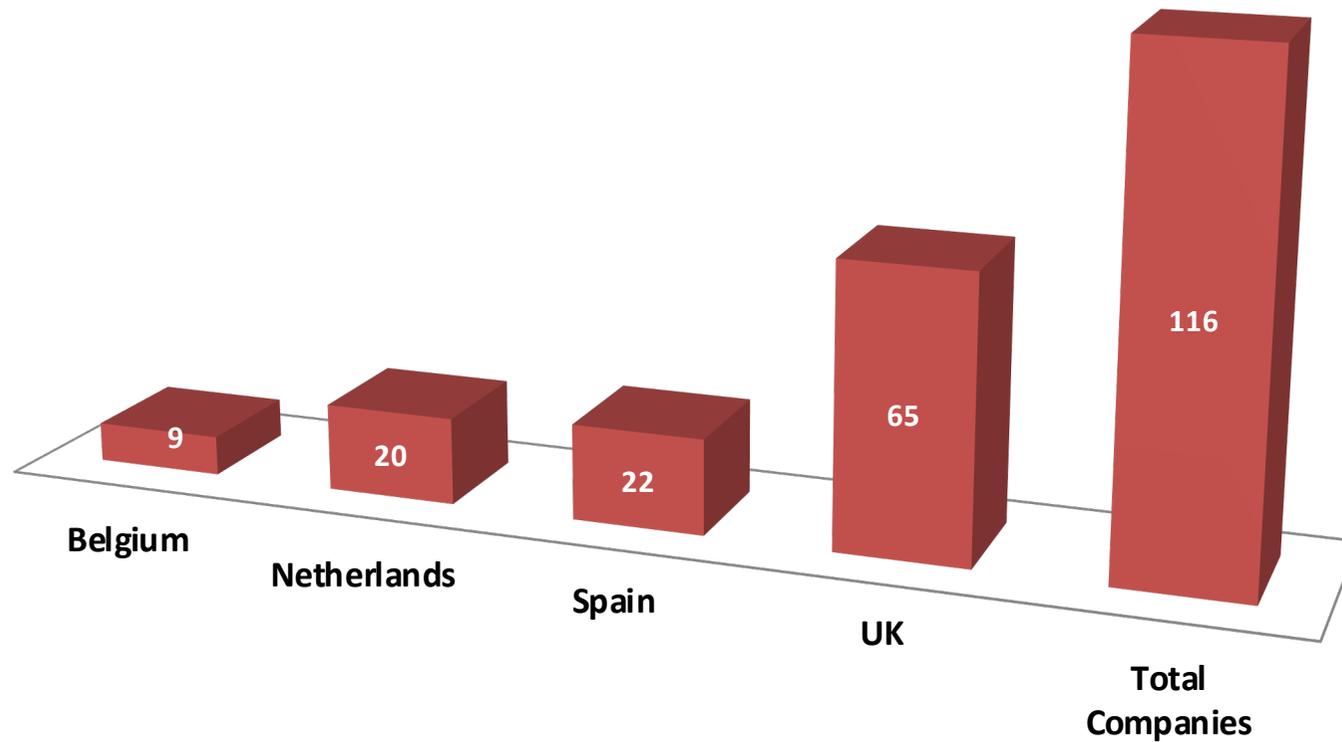
Not a success

- Ceases to trade
- Zombie company with no activity nor clinical trials over multiple years
- Major failure of lead product trial (often with unpublished trial results for academic spin outs and early stage companies)
- Acquisition at a loss, salvage sale of a company

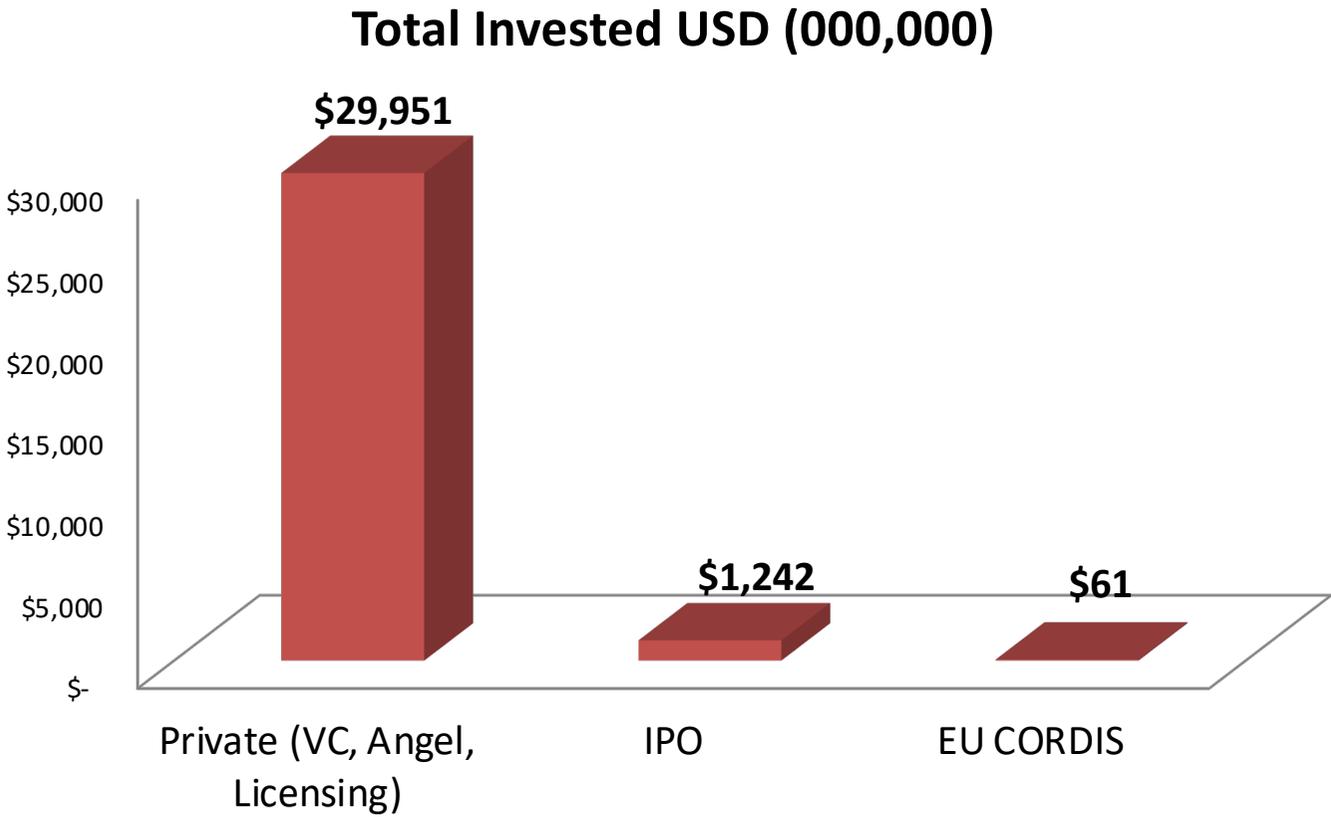
The Study Sources

- Medtrack/Informa
- Annual reports
 - Companies House (UK)
 - Dutch Chamber of Commerce
 - InfoEmpresa (ES)
 - TrendsTop (BE)
- <https://clinicaltrials.gov/>, <https://www.clinicaltrialsregister.eu>
- Press releases/Internet search
- EU CORDIS (Community Research & Development Information Service) and EU FTS (Financial Transparency System) databases – A record of all funding received by organisations from the EU under Framework Research Programmes from 2001 to the present

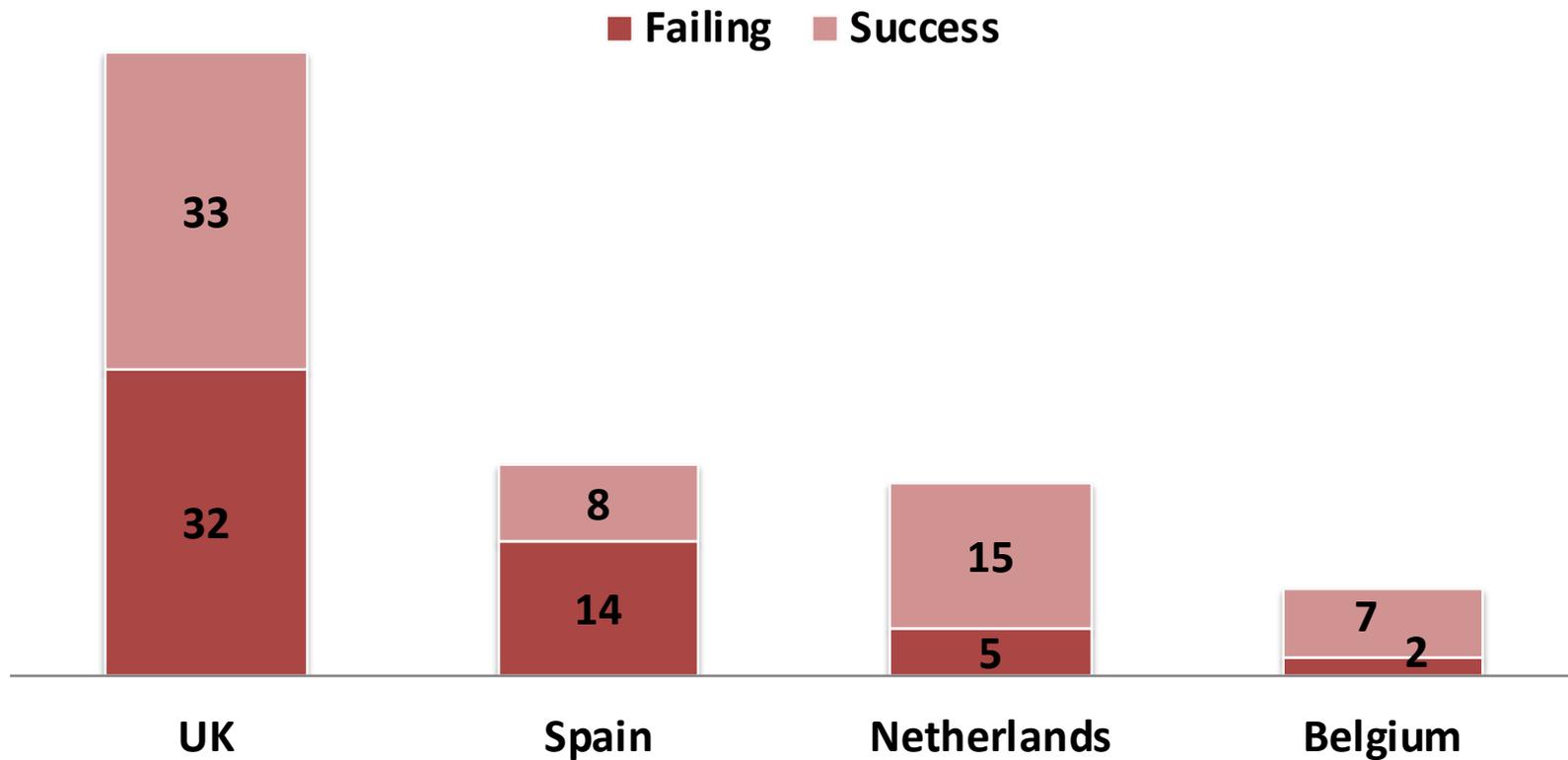
Total Number of Firms Studied by Country



Total Amount of Investment by Type



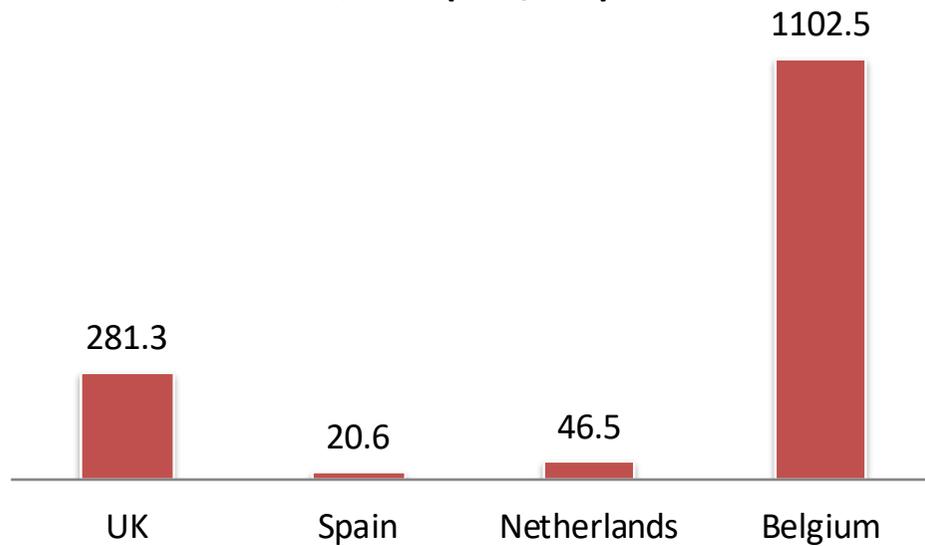
Firms Succeeding and Failing



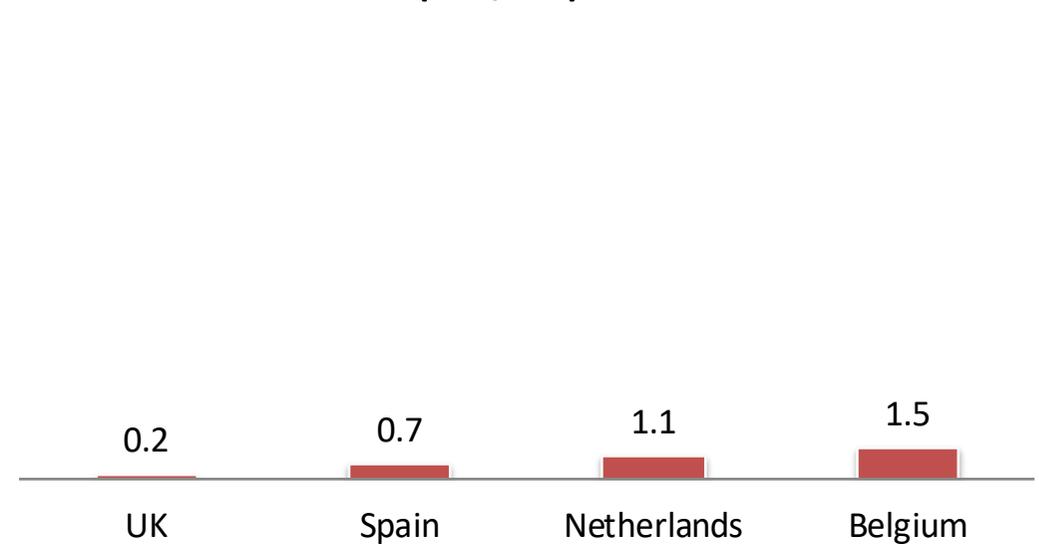
Total Amount of Investment

Average per Firm

Average Total Private Funding Per Firm
\$USD (000,000)



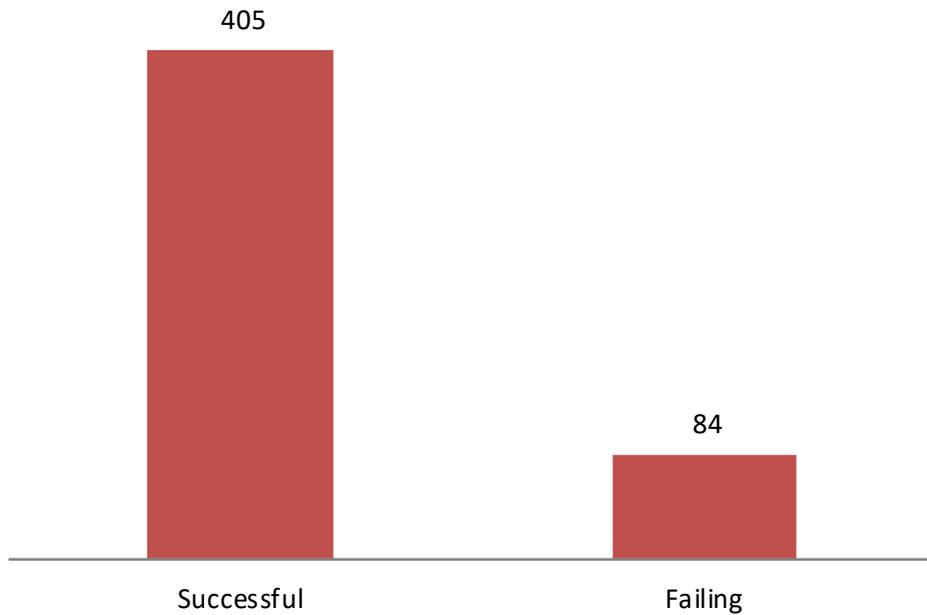
Average EU Funding Per Firm
\$USD (000,000)



Successful and Not Successful Firms

Private Funding Per Firm Far Exceeds That in EU CORDIS

Average Amount Privately Funded
\$US (000,000)

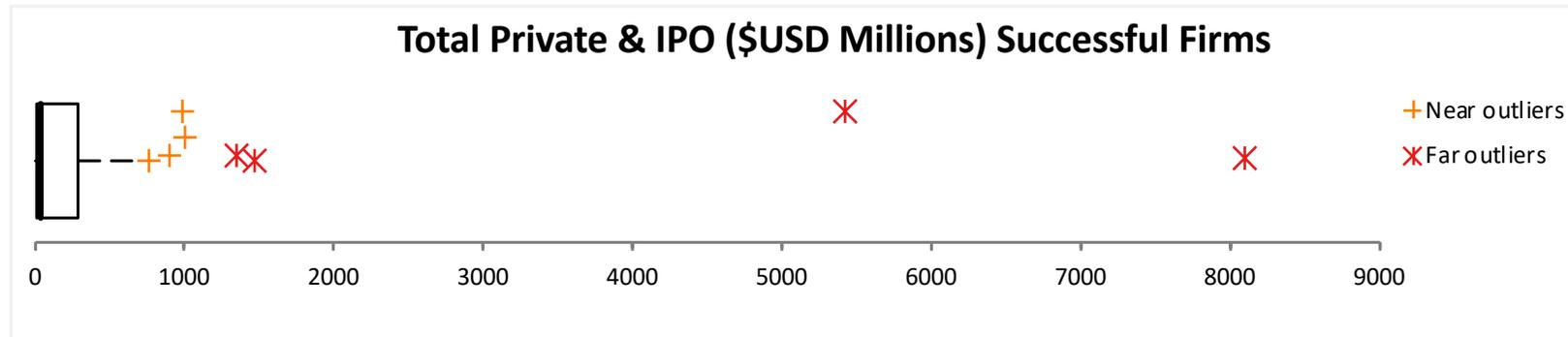


Average Amounts Funded in EU
\$US (000,000)



A Minority of Successful Firms Attract Large Investments

This creates a high amount of variance



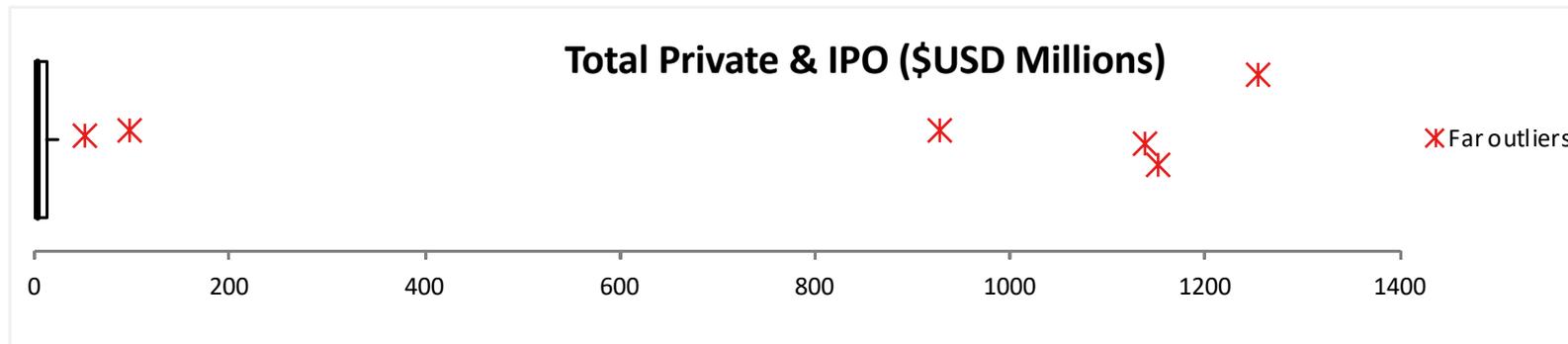
	N	Minimum	1st	Median	3rd	Maximum
Total Private & IPO \$USD Mil	63	0.00	12.272	34.500	280.783	8098.90



The median value means half of our 'successful' firms have raised \$34.5 mil or less

Failing Firms Often Have Large Investments Before the Product Fails

This creates a high amount of variance



	N	Minimum	1st	Median	3rd	Maximum
Total Private & IPO \$USD Mil	53	0.00	0.000	3.300	12.433	1255.20



The median value means half of our 'failing' firms have raised \$3.3 mil or less

Public or Private Investment in IP

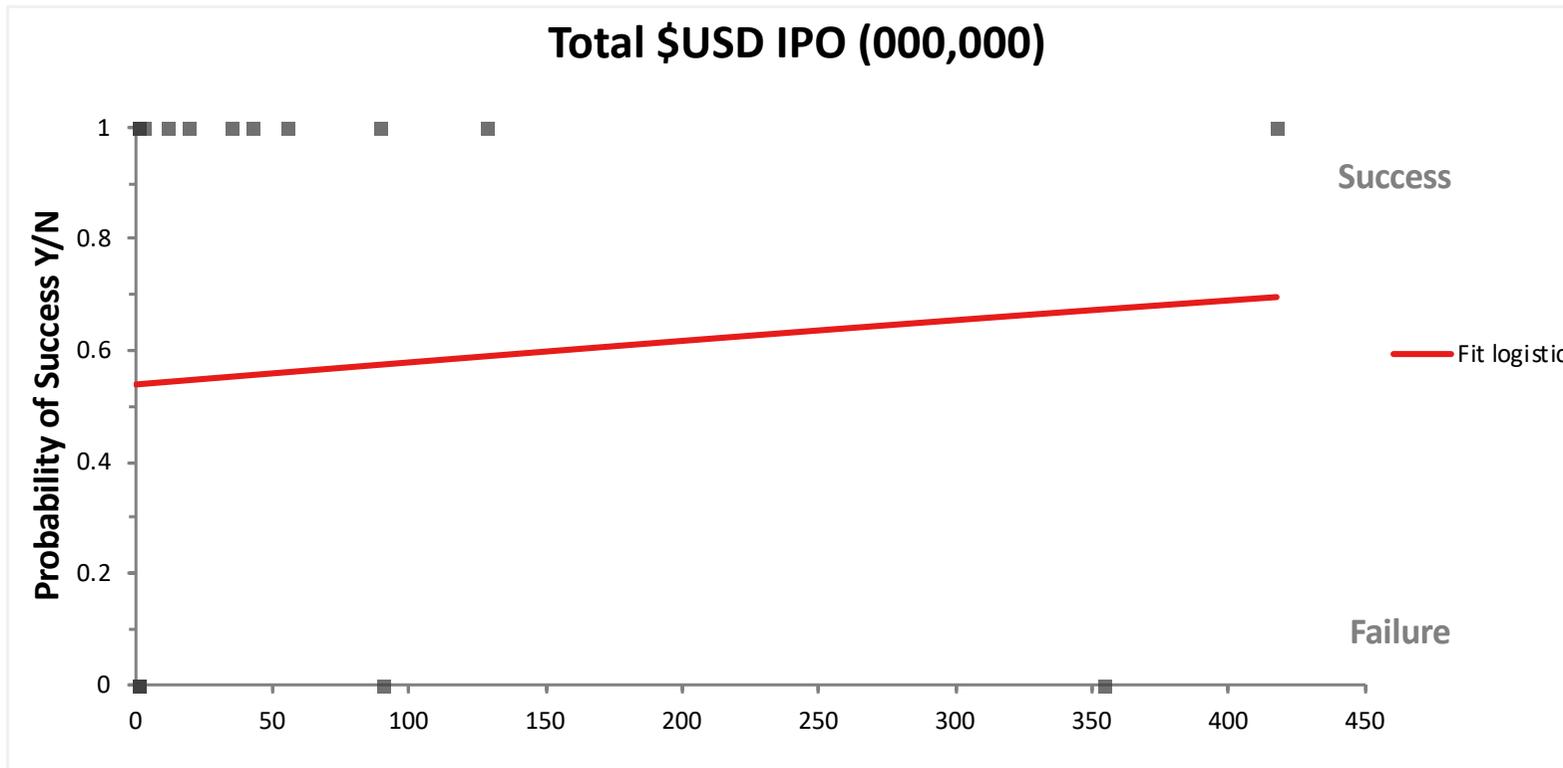
What Drives Success?

Do EU Grants in CORDIS, Private Funders, or IPOs (listing on a stock market) have a statistically significant impact on the success of a firm?

Logistic Regression will allow us to test these hypothesis against a binary answer “Success” or “Fail”

Do IPO's Impact the Success of EU Firms Statistically? No

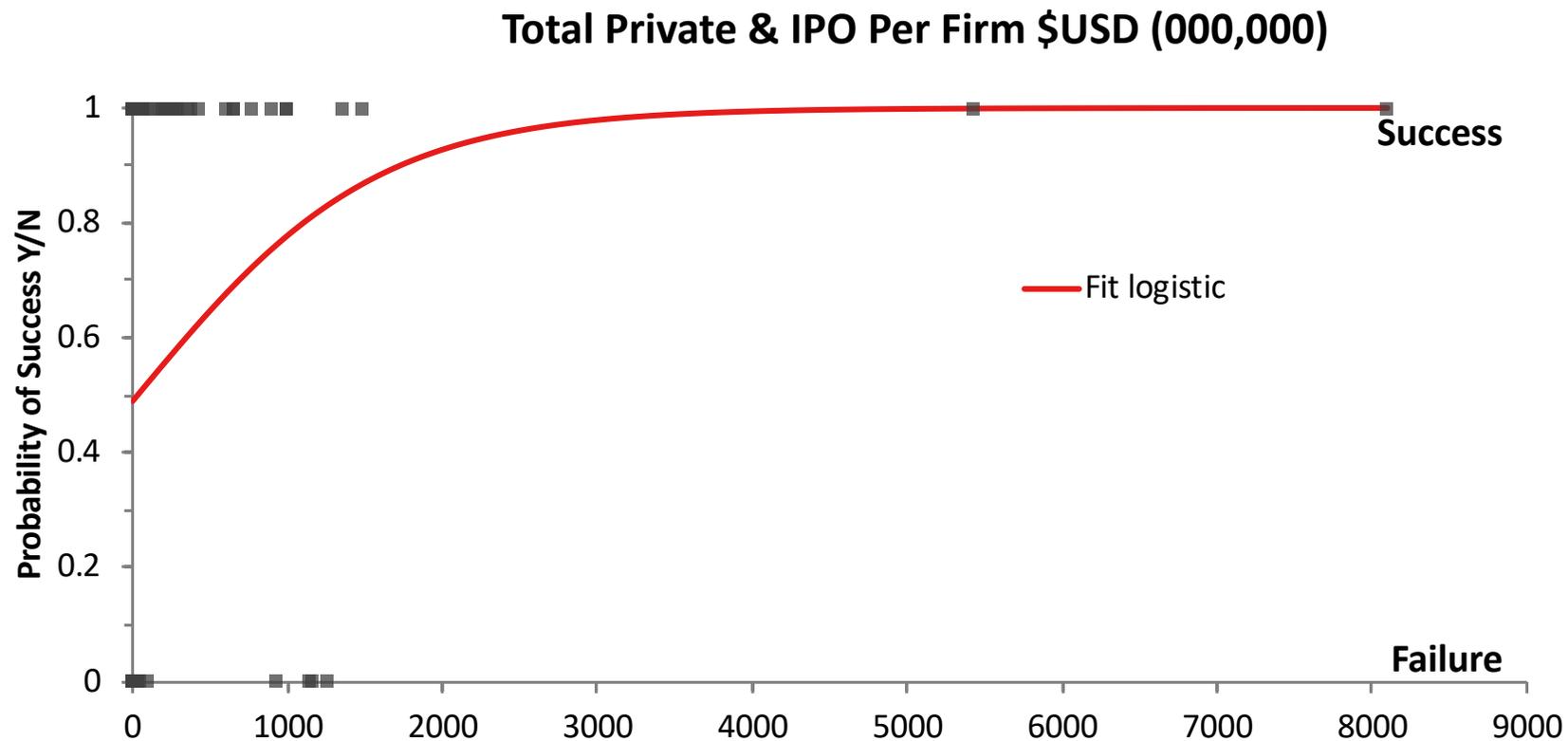
Logistic Regression - Probability of Success



Source	-LogLikelihood	DF	G ² statistic	p
Difference	0.097132	1	0.19	0.6594
Fitted model	79.876	114		
Null model	79.974	115		

Total Private Funding is Statistically Significant

Logistic Regression - Probability of Success

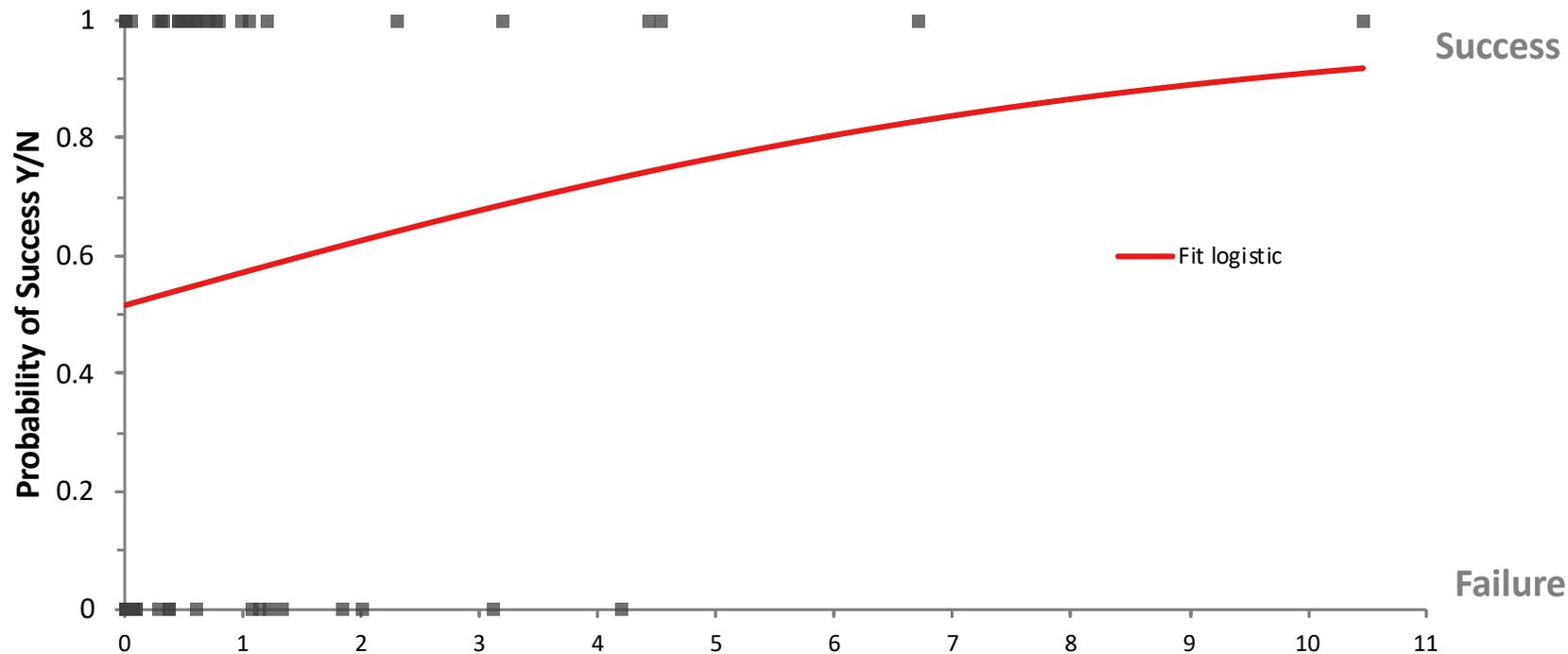


Source	LogLikelihood	DF	G ² statistic	p
Difference	3.2443	1	6.49	0.0109
Fitted model	76.729	114		
Null model	79.974	115		

EU Funding is NOT Statistically Significant

Logistic Regression - Probability of Success

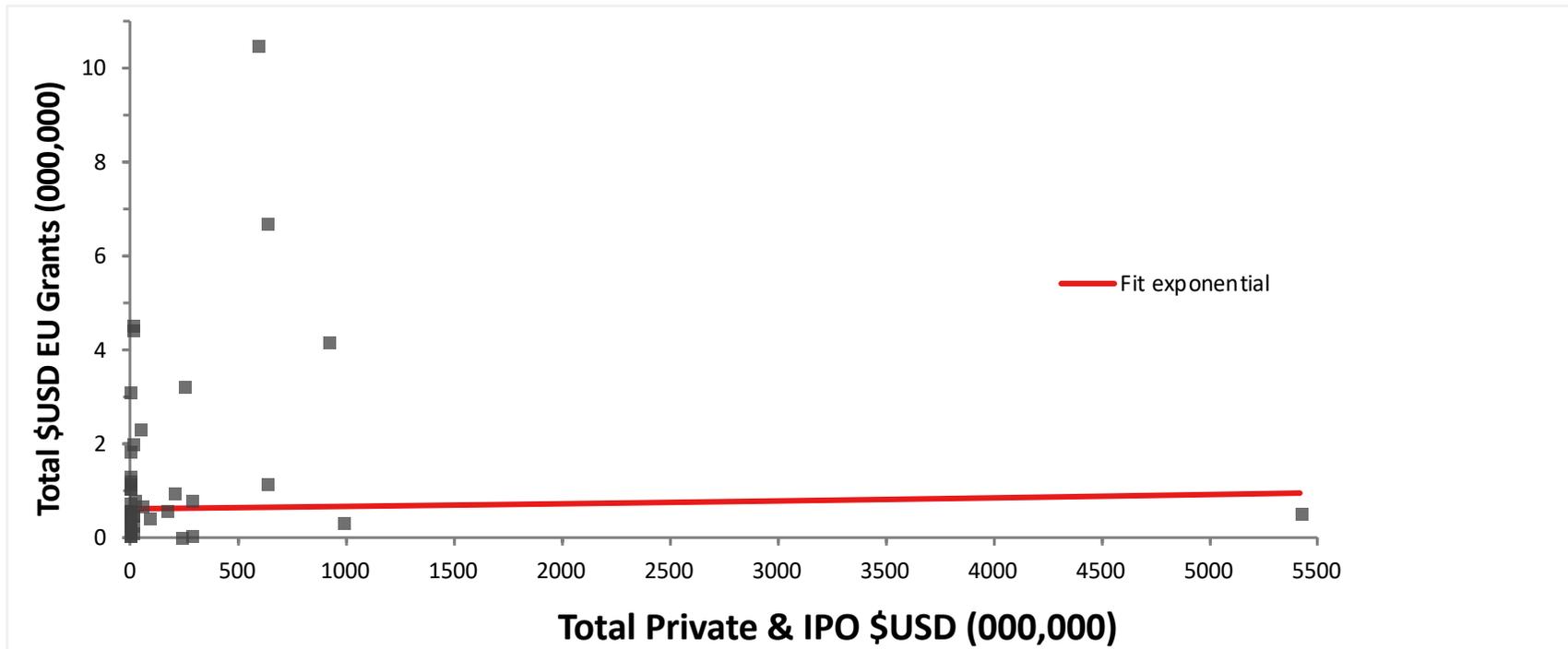
Total EU Grants Per Firm \$USD (000,000)



Source	LogLikelihood	DF	G ² statistic	p
Difference	1.0378	1	2.08	0.1497
Fitted model	78.936	114		
Null model	79.974	115		

Is EU Funding Correlated to Private Funding?

Testing Private Funding's Prediction of EU Funding



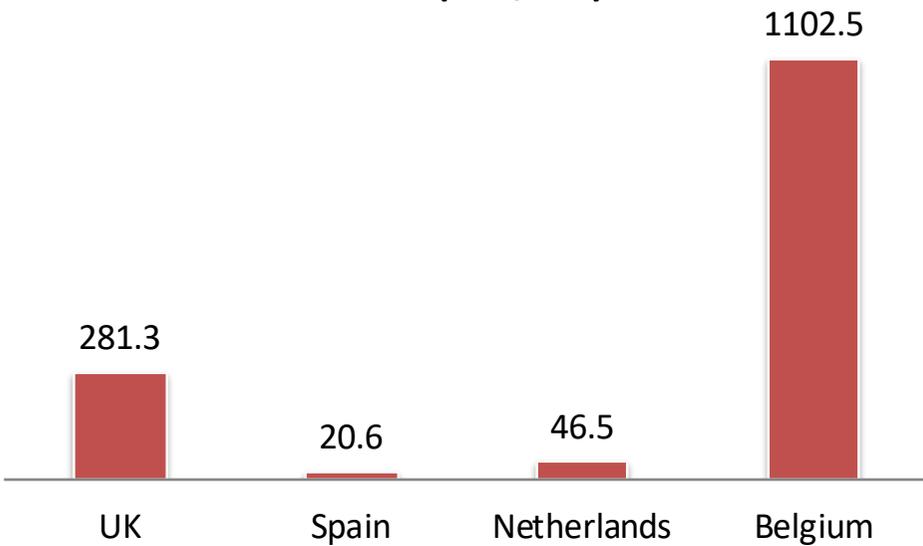
A Mess, No Statistical Certainty...

Source	SS	DF	MS	F	p-value
Difference	0.193622733	1	0.193622733	0.08	0.7739
Error	94.972322463	41	2.316398109		
Null model	95.165945197	42	2.265855838		

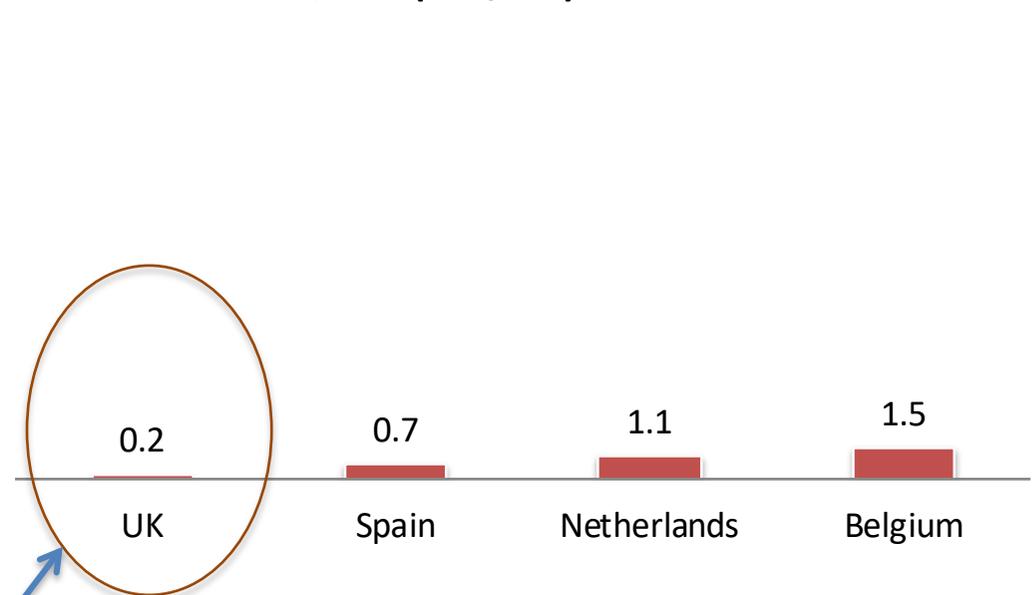
Total Amount of Investment

Average per Firm

Average Total Private Funding Per Firm
\$USD (000,000)

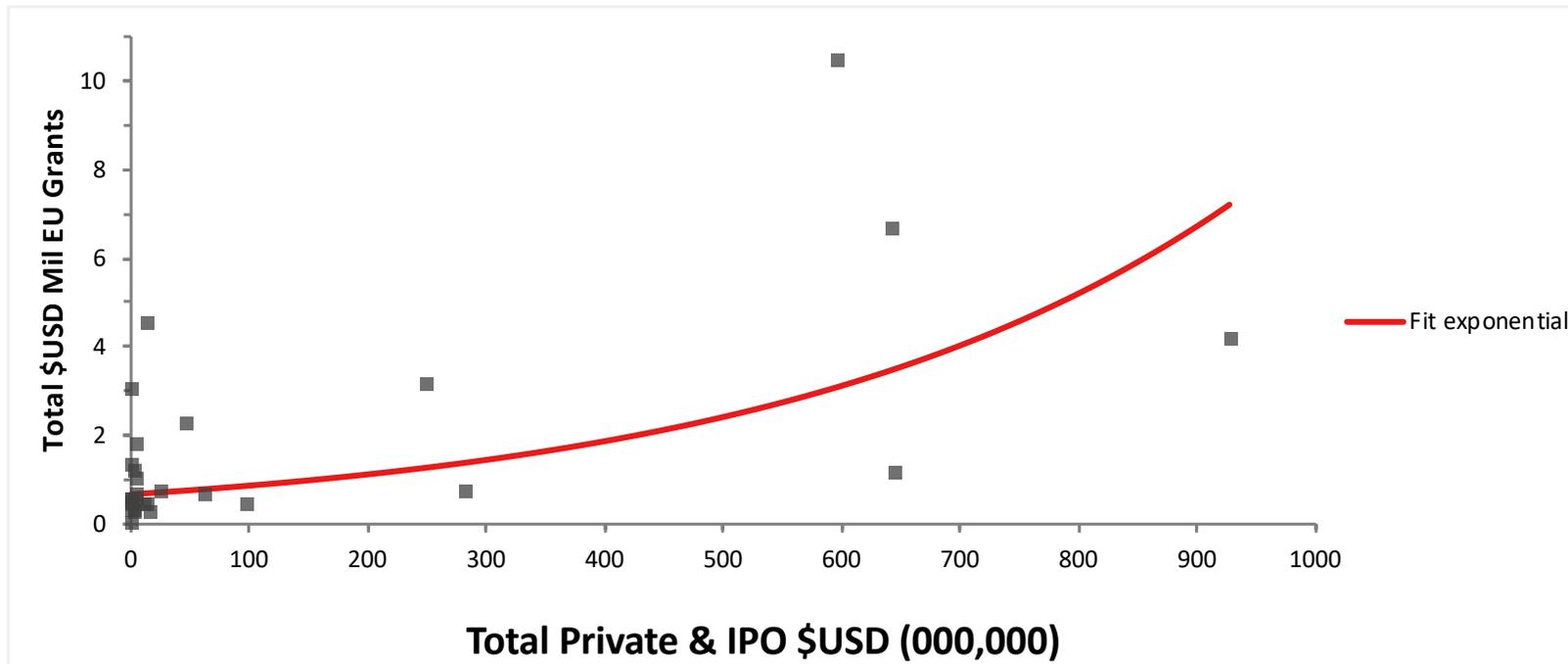


Average EU Funding Per Firm
\$USD (000,000)



Could this be impacting our regression

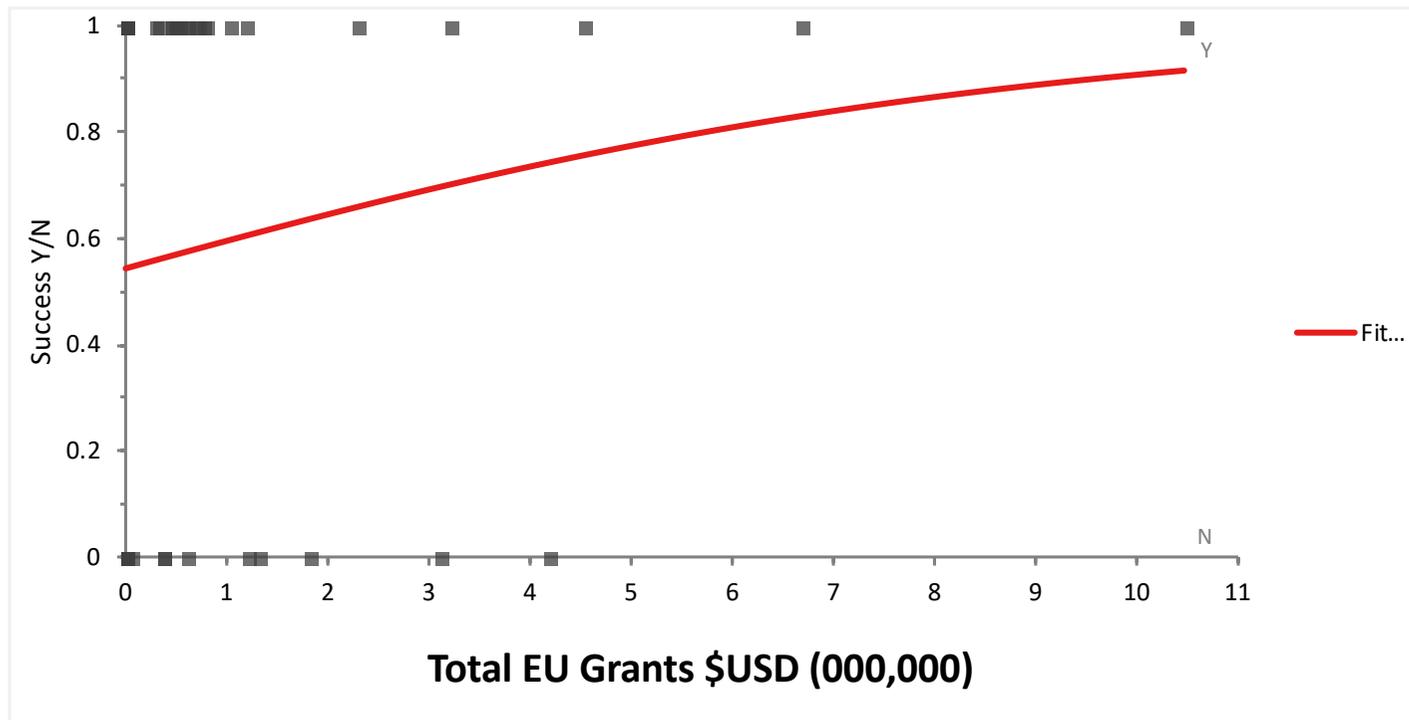
Testing Private Funding's Ability to Predict the Amount of EU Funding in BE, NL, ES (UK Removed)



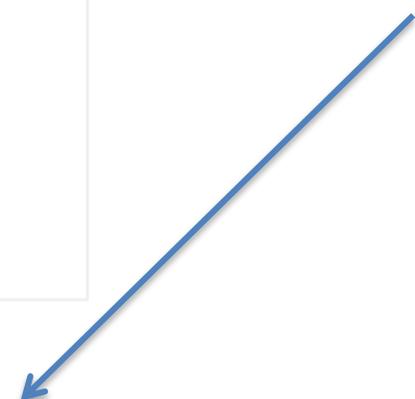
Private funding predicts EU funding to biotech companies - high statistical certainty

Source	SS	DF	MS	F	p-value
Difference	11.379944501	1	11.379944501	13.60	0.0010
Error	22.592707523	27	0.836766945		
Null model	33.972652024	28	1.213309001		

Does EU Funding Predict Success in European Biotech if the UK is Excluded from the data?



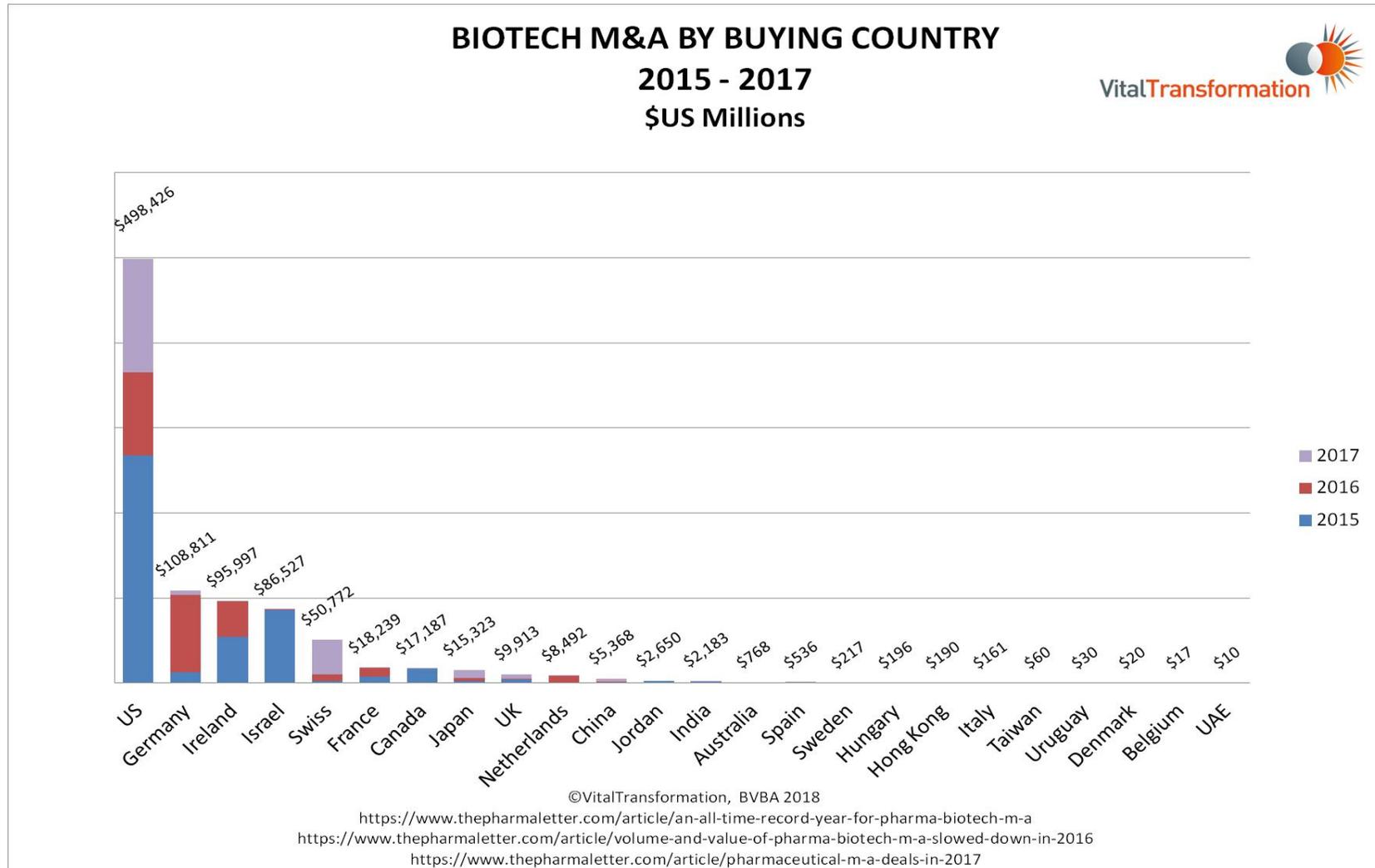
Nope



Source	-LogLikelihood	DF	G ² statistic	p
Difference	0.69921	1	1.40	0.2370
Fitted model	33.853	49		
Null model	34.552	50		

The International Marketplace for Biotech IPR

US Bought 70% of Mature IP in 2017



Research Results

- The total private funding given to a firm (IPO, Private Investment, Licensing) is statistically significant to the firm's probability of success
- Initial Public Offerings (Stock Market Listings) do NOT impact the success of EU firms, this may be a reason that mature firms are leaving the EU
- EU funding given directly to a firm does not impact the success rate of the individual firm with statistical certainty
- EU funding given directly to a firm can be predicted with certainty by the total amount of private investments made to a company in BE, NL, and ES, but not the UK. i.e. Private investments predict levels of EU funding
- “The Market” decides which firms will be successful by allocating resources; actions that impact investor confidence (threats against IPR, attacking market exclusivity) will negatively impact the amount of private money invested and the success of firms

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