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# VC-backed companies' performances

Massimiliano Guerini and Francesca Tenca

# Aim

- To Report **descriptive evidence** based on VICO 2.0 data on **VC-backed companies**
- To Provide **instructions** on how to use the STATA version of VICO 2.0
- Tables and Figures shown in this presentation have been derived from all the 4 tables that constitutes the VICO 2.0 dataset

**VICO 2.0\_Accounting.dta**

**Accounting and employment data**

# VICO 2.0\_Accounting.dta

- Key variables:
  - Employees
  - Sales
  - Total Assets
  - Cash and Cash-flows
  - Total financial debt
- All variables are **time-varying**

# Summary statistics

variable	N	mean	sd	min	max
Numberofemploy~s	30,863	287.246	4,111.15	0	233,600
SalesthEUR	41,509	52,599.1	725,392	-6,081.73	3.60e+07
TotalassetsthEUR	62,452	355,723	2.26e+07	0	2.59e+09
Cashcashequiva~R	58,432	8,137.91	329,365	-212.354	3.87e+07
CashflowthEUR	38,767	4,088.55	115,860	-1.01e+07	7342130
Longtermdebtth~R	49,197	20,366	416,330	-3,580.83	3.08e+07
LoansthEUR	56,769	8,718.59	316,240	-3,106.8	3.57e+07
Totalfinancial~R	45,447	32,080.3	623,624	-3,580.83	3.57e+07

# Summary statistics – Employees

## Number of employees

Percentiles		Smallest		
1%	1	0		
5%	2	0		
10%	3	0	Obs	30,863
25%	8	0	Sum of Wgt.	30,863
50%	25		Mean	287.246
		Largest	Std. Dev.	4111.153
75%	77	183700		
90%	230	185965	Variance	1.69e+07
95%	552	199800	Skewness	34.91353
99%	2984	233600	Kurtosis	1391.479

# Summary statistics – Sales

SalesthEUR

Percentiles		Smallest		
1%	0	-6081.732		
5%	13.146	-2003		
10%	68.93662	-1272	Obs	41,509
25%	420.021	-1193.399	Sum of Wgt.	41,509
50%	2363.35		Mean	52599.09
			Std. Dev.	725392.3
75%	10889.69	3.32e+07		
90%	40889	3.48e+07	Variance	5.26e+11
95%	92880.71	3.51e+07	Skewness	33.95644
99%	590035	3.60e+07	Kurtosis	1336.18

# Outliers

- The presence of outliers could severely bias analyses based on these data
- To avoid this problem, we **winsorise variables** (e.g. Dixon, 1960) with a 2% cut-off for each tail
  - For each variable we calculate the values corresponding to the 2nd and 98th percentiles of its distribution and assign these values to all observations falling beyond them
- This approach:
  - reduces the impact of outliers
  - allows the use of a larger number of observations than would be possible if outliers were deleted



# Summary statistics

variable	N	mean	sd	min	max
Numberofemplo~02	30,863	108.868	257.786	1	1,468
SalesthEUR02	41,509	17,695.2	45,492.4	.001	262,155
Totalassetsth~02	62,452	15,388	44,216.5	.498914	259,704
Cashcashequiv~02	58,432	1,677.71	4,438.19	.115981	25,369
CashflowthEUR02	38,767	734.636	4,890.65	-10,677.2	24,428
Longtermdebt~02	49,197	2,616.88	8,709.24	0	52,395.5
LoansthEUR02	56,769	1,462.63	5,028.72	0	29,686
Totalfinancia~02	45,447	5,019.38	16,237.5	0	97,629

**VICO 2.0\_Panel.dta**

**VC-backed before vs after first investment**

# VICO 2.0\_Panel.dta

- A **VICO 2.0\_Panel.dta** STATA dataset can be derived by merging the Accounting Table with the Company and Investments Tables
- The dataset allows to analyze:
  - Accounting and employment data
  - Pre-Post investment dynamics

# VC-backed companies before vs after

- What about **VC-backed companies before** the **receipt** of the first round of VC?
- *VCstep* variable: dummy variable that equals 1 from the year of receipt of the first VC investment onwards (zero otherwise)
  - To be defined for each type of VC investor
  - Selection vs Treatment Effect

# VC-backed companies before vs after

CompanyID[44]		VICO10003			
	CompanyID	year	IVCyear	IVCstep	
12	VIC0100	2005	2003	1	
13	VIC0100	2006	2003	1	
14	VIC0100	2007	2003	1	
15	VIC0100	2008	2003	1	
16	VIC0100	2009	2003	1	
17	VIC0100	2010	2003	1	
18	VIC0100	2011	2003	1	
19	VIC0100	2012	2003	1	
20	VIC0100	2013	2003	1	
21	VIC0100	2014	2003	1	
22	VIC01000	2005	2012	0	
23	VIC01000	2006	2012	0	
24	VIC01000	2007	2012	0	
25	VIC01000	2008	2012	0	
26	VIC01000	2009	2012	0	
27	VIC01000	2010	2012	0	
28	VIC01000	2011	2012	0	
29	VIC01000	2012	2012	1	
30	VIC01000	2013	2012	1	
31	VIC01000	2014	2012	1	

# VC-backed before vs after – Total Assets

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	12,688	5777.916	233.3425	26283.94	5320.53	6235.303
1	49,764	17838.21	212.5357	47412.14	17421.63	18254.78
combined	62,452	15387.99	176.9341	44216.54	15041.2	15734.78
diff		-12060.29	315.6266		-12678.93	-11441.65

diff = mean(0) - mean(1)

t = -38.2106

Ho: diff = 0

Satterthwaite's degrees of freedom = 36129.8

Ha: diff < 0

Pr(T < t) = 0.0000

Ha: diff != 0

Pr(|T| > |t|) = 0.0000

Ha: diff > 0

Pr(T > t) = 1.0000

# VC and company size

- VC-backed companies **before** receipt of VC are **smaller** than VC-backed companies after receipt of VC
- **Positive impact of VC on company size?**
  - Results are similar when looking at sales or employees

# VC-backed before vs after – Sales

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	7,554	7917.044	330.9498	28764.09	7268.29	8565.798
1	33,955	19870.61	261.3885	48165.74	19358.28	20382.94
combined	41,509	17695.24	223.2893	45492.42	17257.59	18132.89
diff		-11953.56	421.7247		-12780.18	-11126.94

diff = mean(0) - mean(1)

t = -28.3445

Ho: diff = 0

Satterthwaite's degrees of freedom = 18328.7

Ha: diff < 0

Pr(T < t) = 0.0000

Ha: diff != 0

Pr(|T| > |t|) = 0.0000

Ha: diff > 0

Pr(T > t) = 1.0000



# VC-backed before vs after – Employees

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	4,826	62.23933	2.811311	195.3002	56.72788	67.75078
1	26,037	117.5108	1.653946	266.8806	114.269	120.7527
combined	30,863	108.8681	1.467373	257.7861	105.992	111.7442
diff		-55.27152	3.261749		-61.66534	-48.8777

diff = mean(0) - mean(1) t = -16.9454  
 Ho: diff = 0 Satterthwaite's degrees of freedom = 8553.18

Ha: diff < 0  
 Pr(T < t) = 0.0000

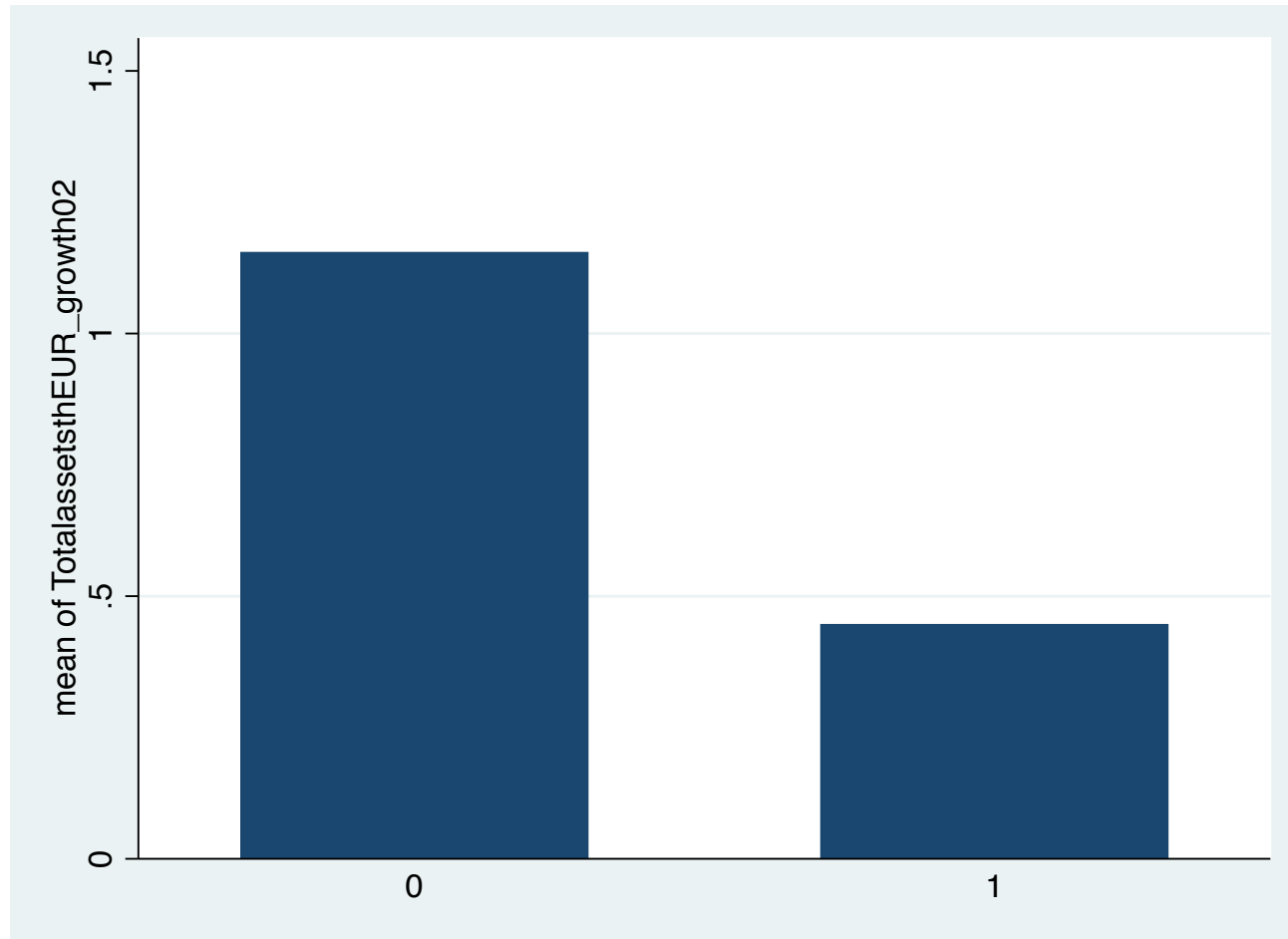
Ha: diff != 0  
 Pr(|T| > |t|) = 0.0000

Ha: diff > 0  
 Pr(T > t) = 1.0000

# What about growth?

- **Does VC investors select high-growth firms?**
- **What about the growth of VC backed companies before receipt of the first round of VC?**
- Growth variables:
  - Total Assets w02 growth
  - Sales w02 growth
  - Employees w02 growth

# VC-backed before vs after – Total assets growth



# VC-backed before vs after – Total assets growth

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	7,874	1.154452	.0280863	2.492253	1.099396	1.209509
1	42,594	.4461439	.0077594	1.601403	.4309354	.4613524
combined	50,468	.5566539	.0079621	1.788693	.5410481	.5722597
diff		.7083082	.0291384		.6511904	.7654261

diff = mean(0) - mean(1)

t = 24.3084

Ho: diff = 0

Satterthwaite's degrees of freedom = 9110.86

Ha: diff < 0

Pr(T < t) = 1.0000

Ha: diff != 0

Pr(|T| > |t|) = 0.0000

Ha: diff > 0

Pr(T > t) = 0.0000

# What about growth?

- **Key results:**
  - VC investors do select high-growth companies
  - The growth of VC backed companies is higher before receipt of a VC investment
- A similar evidence is obtained when looking at sales and employment growth

# Debt

- It could be interesting to investigate whether there are differences in the **capital structure** of companies depending on the receipt of VC
- VC financing may convey a credible signal to capital markets about company's quality:
  - we would expect creditors to be more willing to lend money to VC-backed companies
- *DebtAssetsRatio02*: long-term financial debt on total assets (winsorized)

# VC-backed before vs after – Debt on Assets

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	9,526	.2274073	.0048991	.478159	.217804	.2370106
1	39,606	.2987859	.0031333	.6235749	.2926445	.3049274
combined	49,132	.2849466	.0027015	.5988108	.2796516	.2902416
diff		-.0713786	.0058154		-.0827774	-.0599798

diff = mean(0) - mean(1)

t = -12.2740

Ho: diff = 0

Satterthwaite's degrees of freedom = 18179.7

Ha: diff < 0

Pr(T < t) = 0.0000

Ha: diff != 0

Pr(|T| > |t|) = 0.0000

Ha: diff > 0

Pr(T > t) = 1.0000

# VC-backed before vs after – Cash-flows on Assets

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	7,238	<b>-.1315906</b>	.0062951	.5355611	-.1439308	-.1192505
1	31,508	<b>-.1450797</b>	.0030583	.5428669	-.1510741	-.1390853
combined	38,746	-.1425599	.0027511	.5415283	-.1479521	-.1371676
diff		<b>.0134891</b>	.0069986		-.0002296	.0272077

diff = mean(0) - mean(1)

t = 1.9274

Ho: diff = 0

Satterthwaite's degrees of freedom = 10916.8

Ha: diff < 0

Pr(T < t) = 0.9730

Ha: diff != 0

Pr(|T| > |t|) = 0.0540

Ha: diff > 0

Pr(T > t) = 0.0270



**VICO 2.0\_Panel.dta**

**Pre-Post Investment Dynamics**

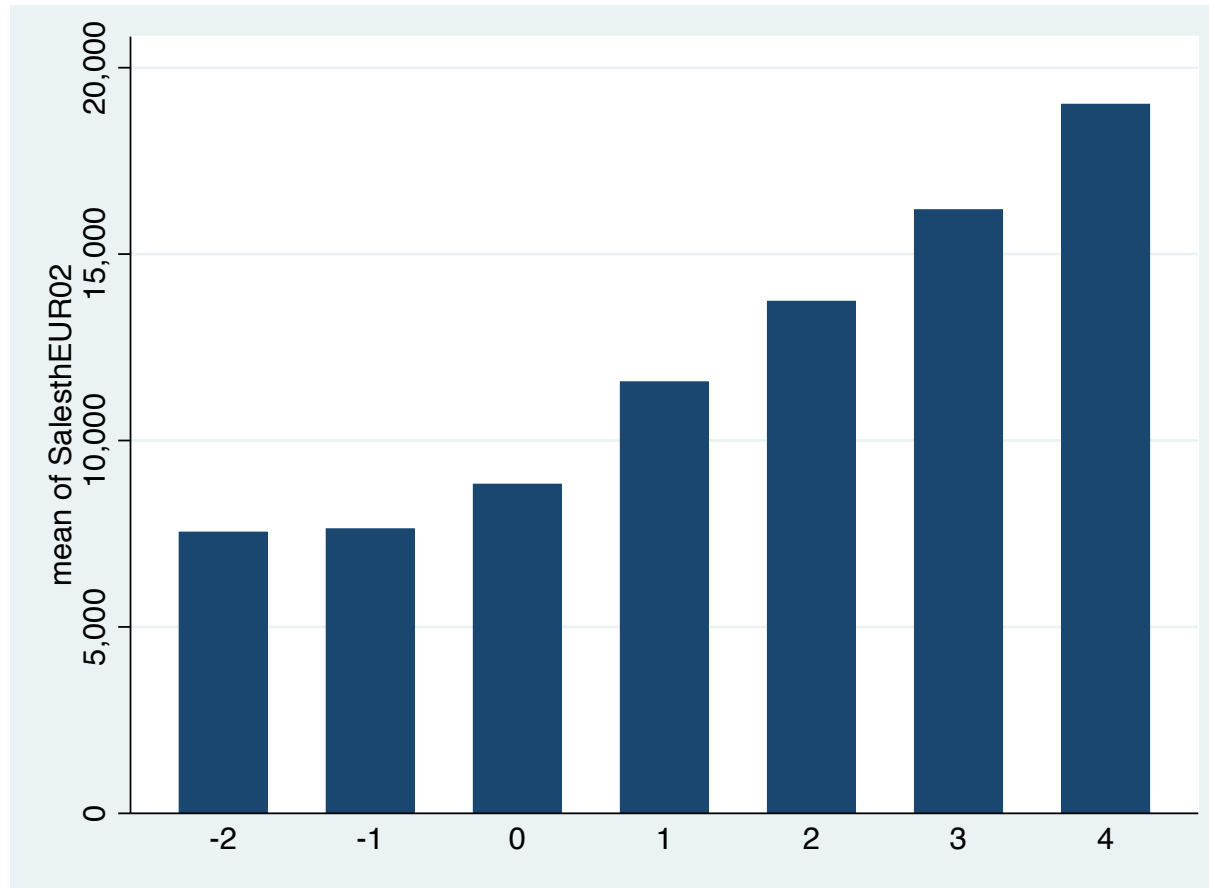
# Pre post VC Investment Dynamics

- Focus on VC-backed firms:
  - Before and after receipt of VC
- Evaluation of accounting data in the years around the first VC investment
- Key variable:
  - *time\_at\_VC*: difference between the year and the year of the first VC investment in the focal company (years after the first VC investment)

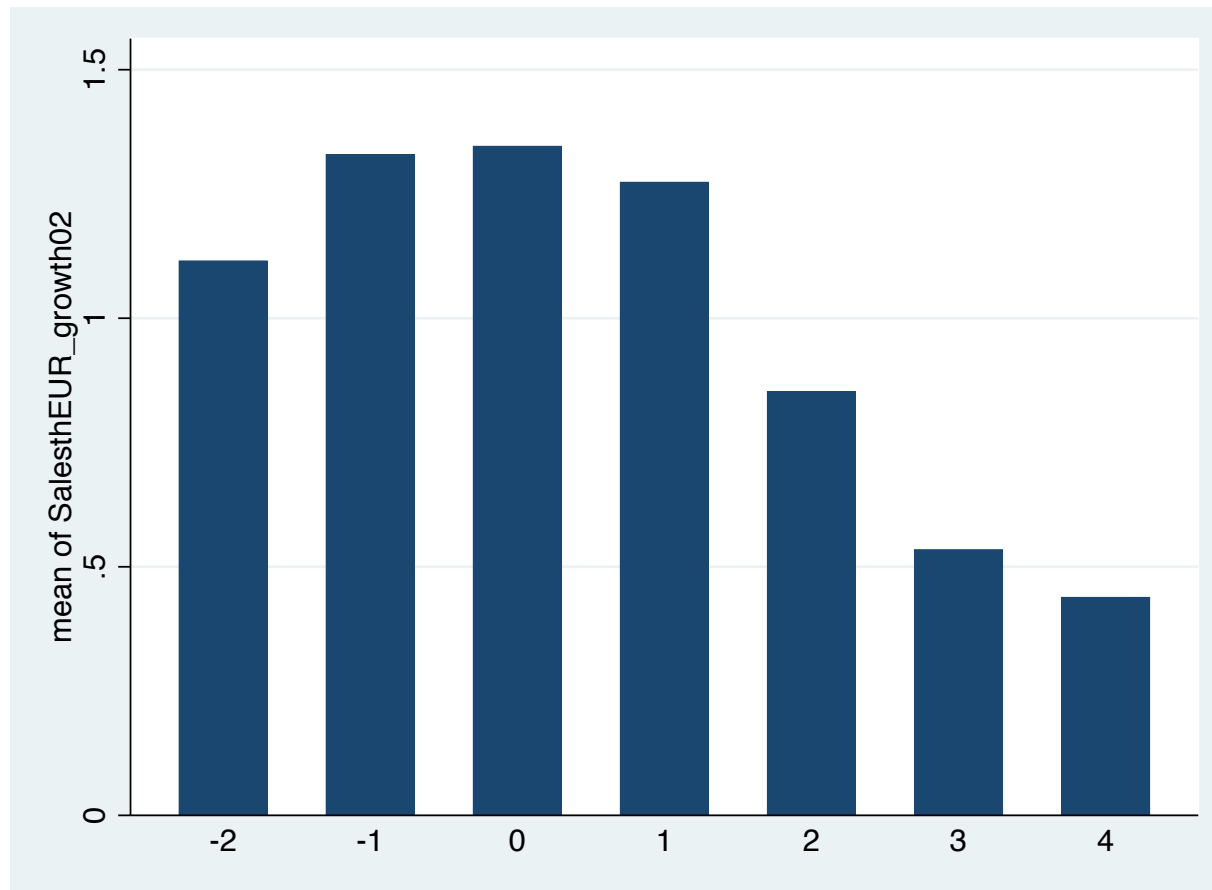
# Time at VC

time_at_VC	Freq.	Percent	Cum.
-5	5,153	4.62	4.62
-4	5,855	5.25	9.86
-3	6,719	6.02	15.88
-2	7,552	6.77	22.65
-1	8,407	7.53	30.18
0	8,887	7.96	38.15
1	8,433	7.56	45.70
2	8,075	7.24	52.94
3	7,629	6.84	59.78
4	7,667	6.87	66.65
5	8,342	7.47	74.12
6	8,284	7.42	81.54
7	7,706	6.91	88.45
8	6,873	6.16	94.61
9	6,018	5.39	100.00
Total	111,600	100.00	

# Sales dynamic



# Sales growth dynamic



# Debt on assets

