

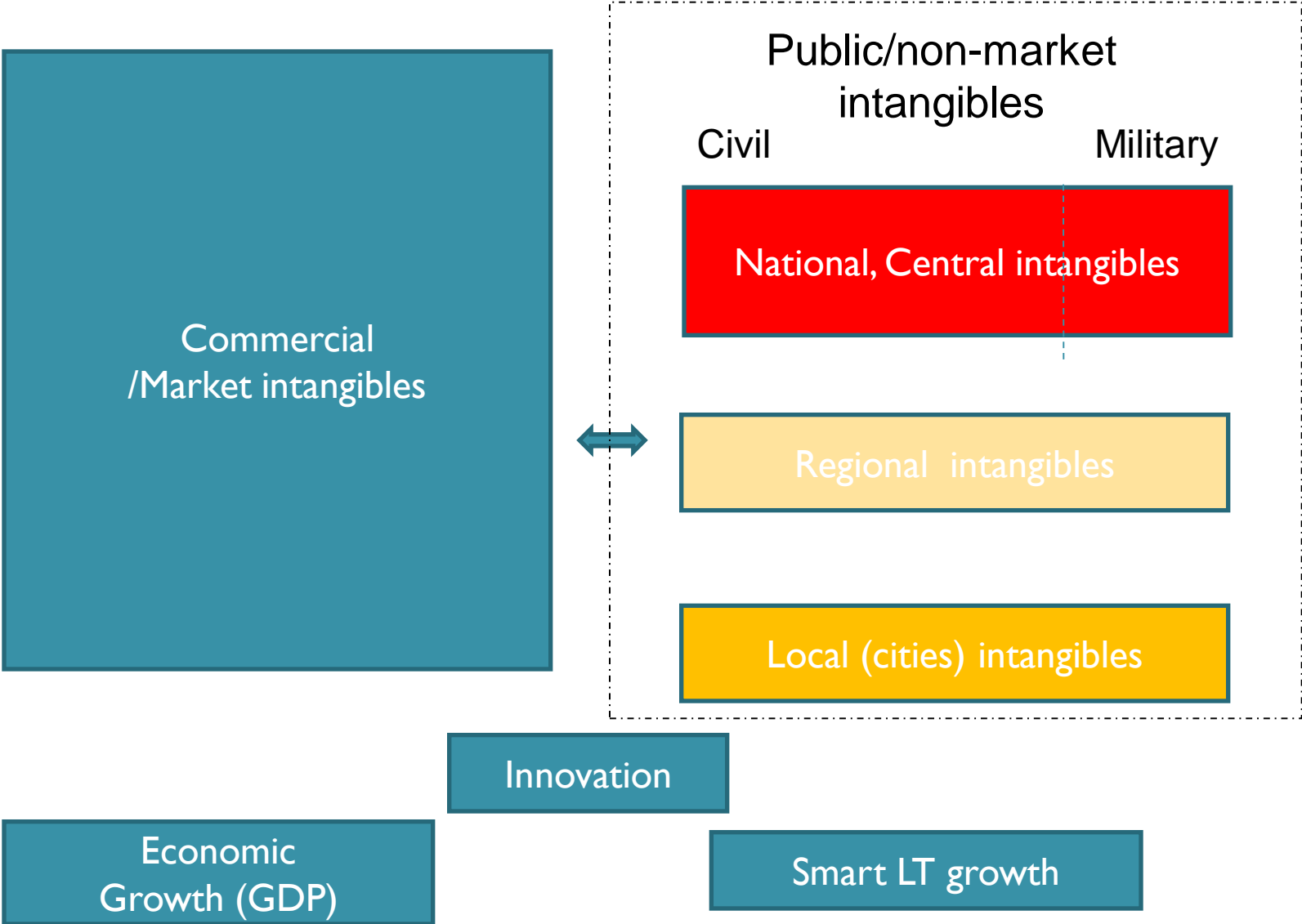
# The Franco-German Round Table on Intangibles -The 3rd conference-

## Public and private intangible investments in France: an analysis in terms of complementarities

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Andrés Barreneche  
Vincent Delbecque



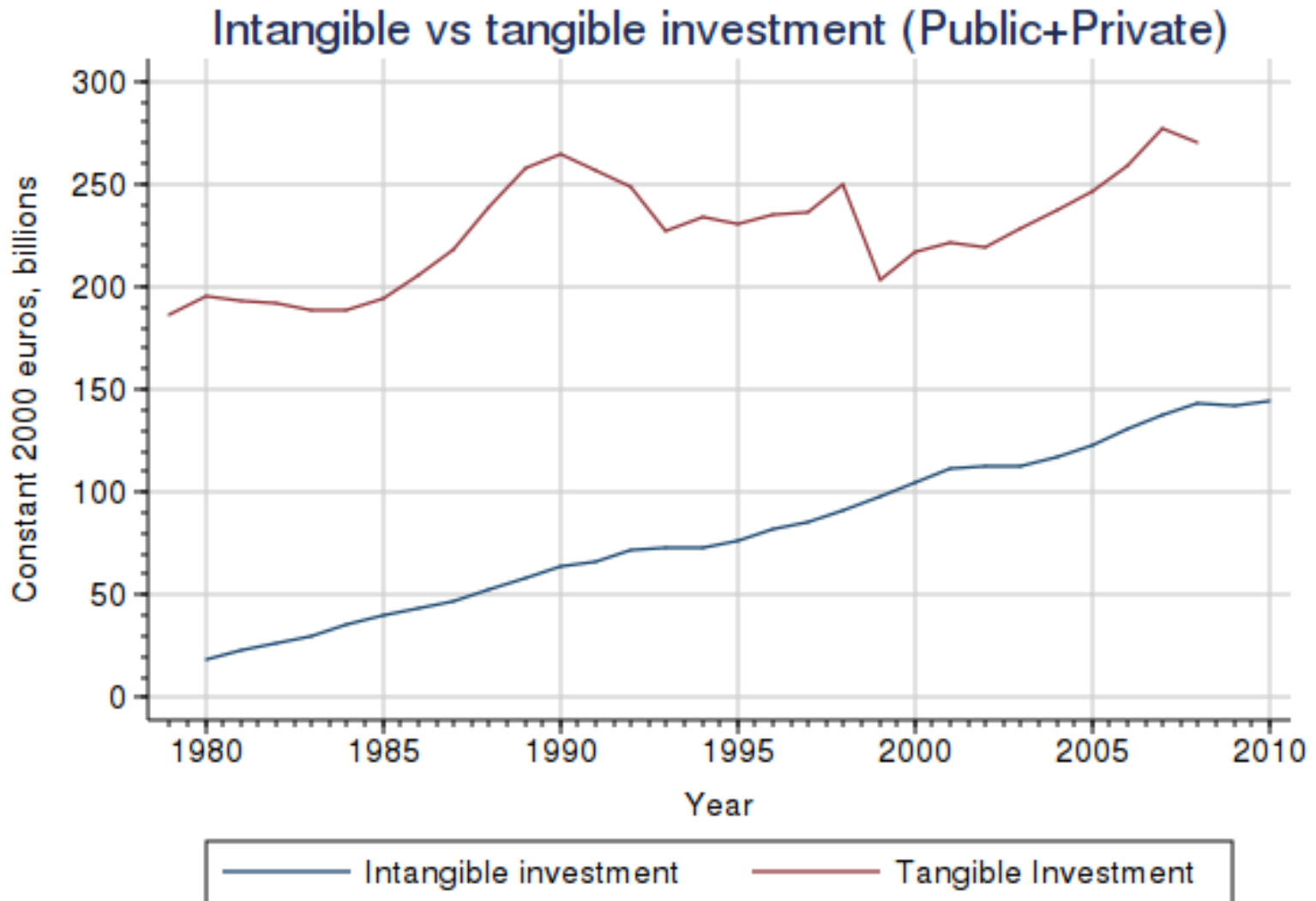
# Defining public sector intangibles



# Current situation in France

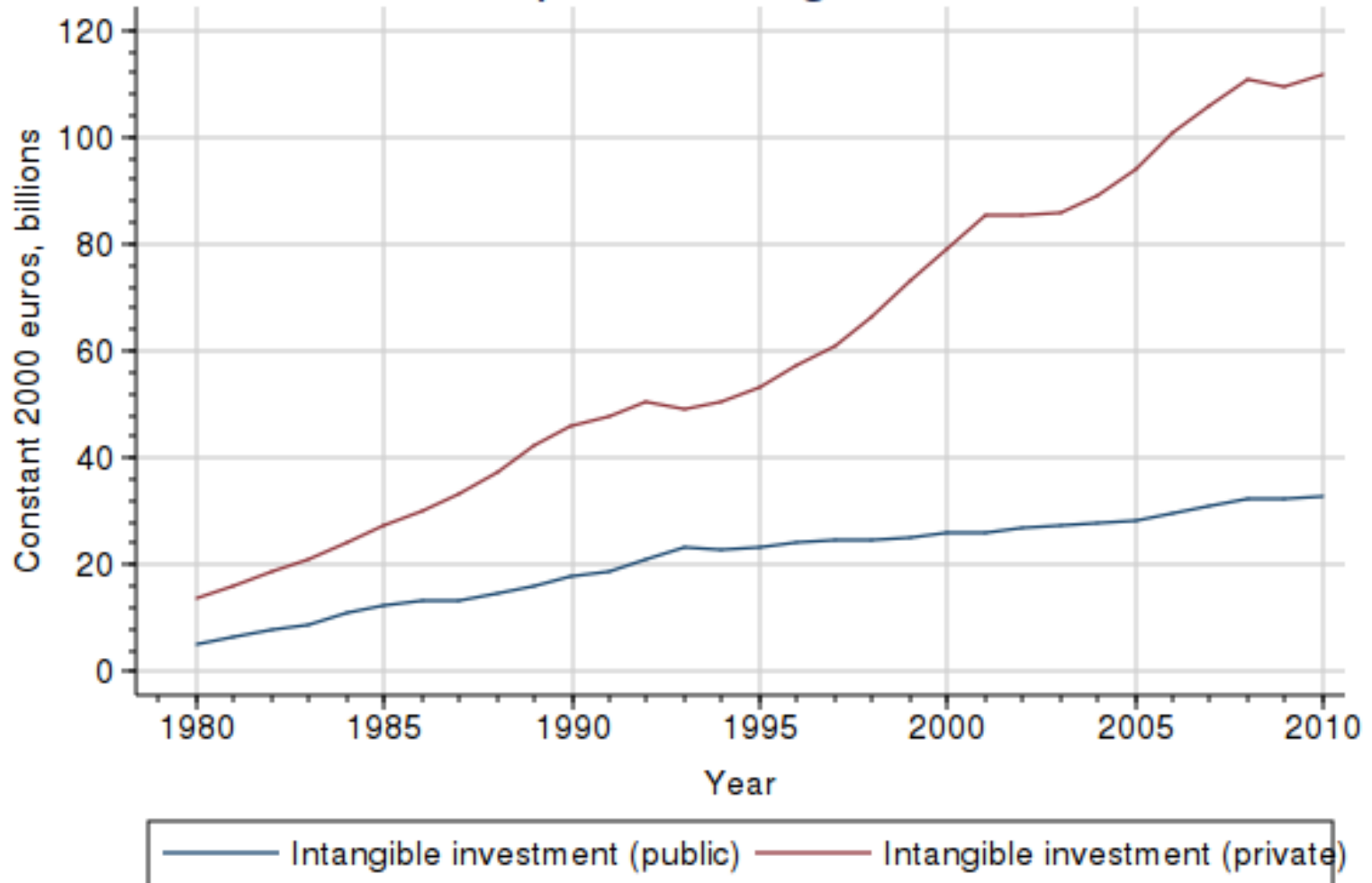
- Analysis of the following intangible investments
  - Advertising
  - Artistic Originals
  - Databases
  - Design
  - Marketing
  - Organizational Capital
  - R&D
  - Software
  - Training

# Current situation in France

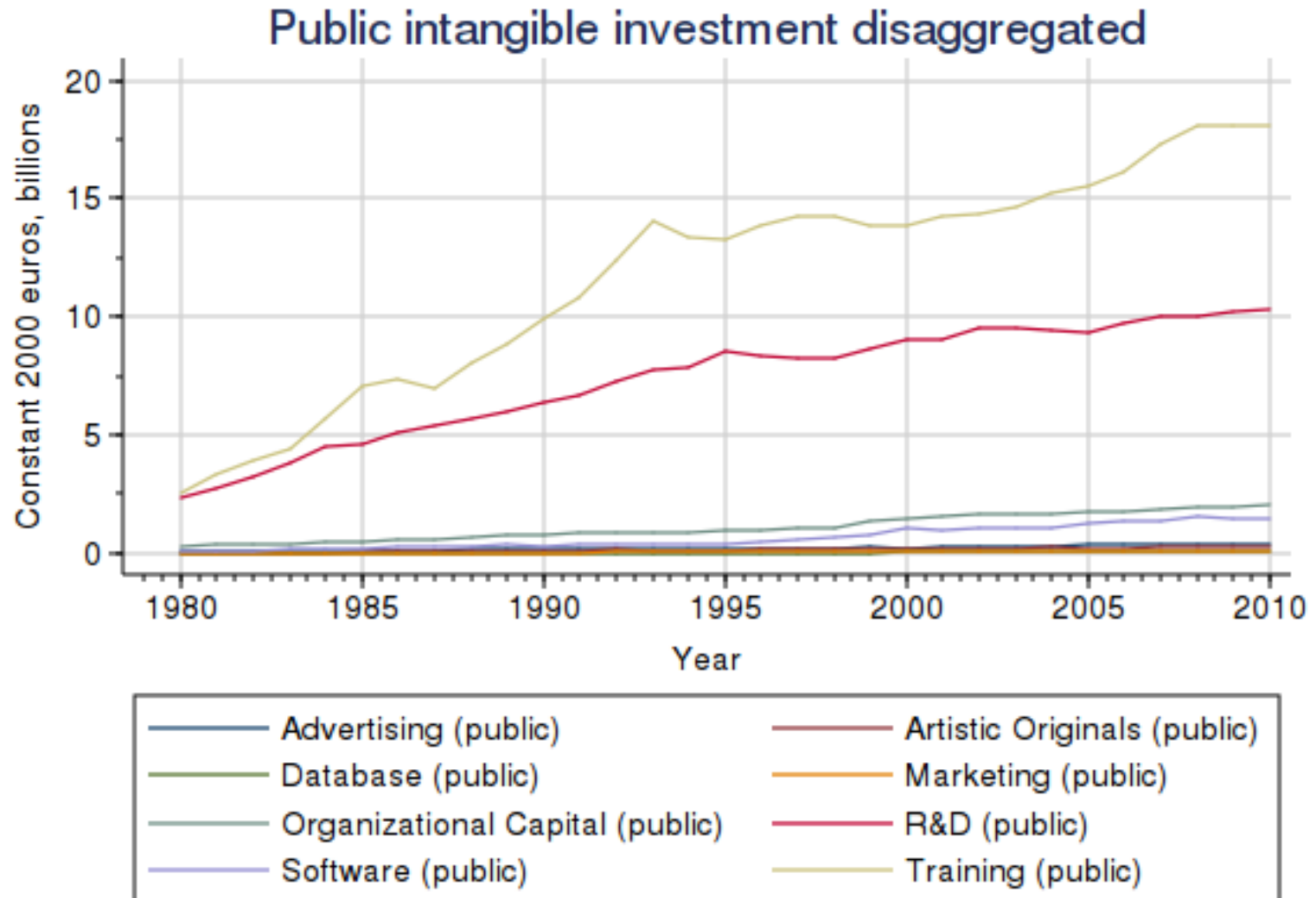


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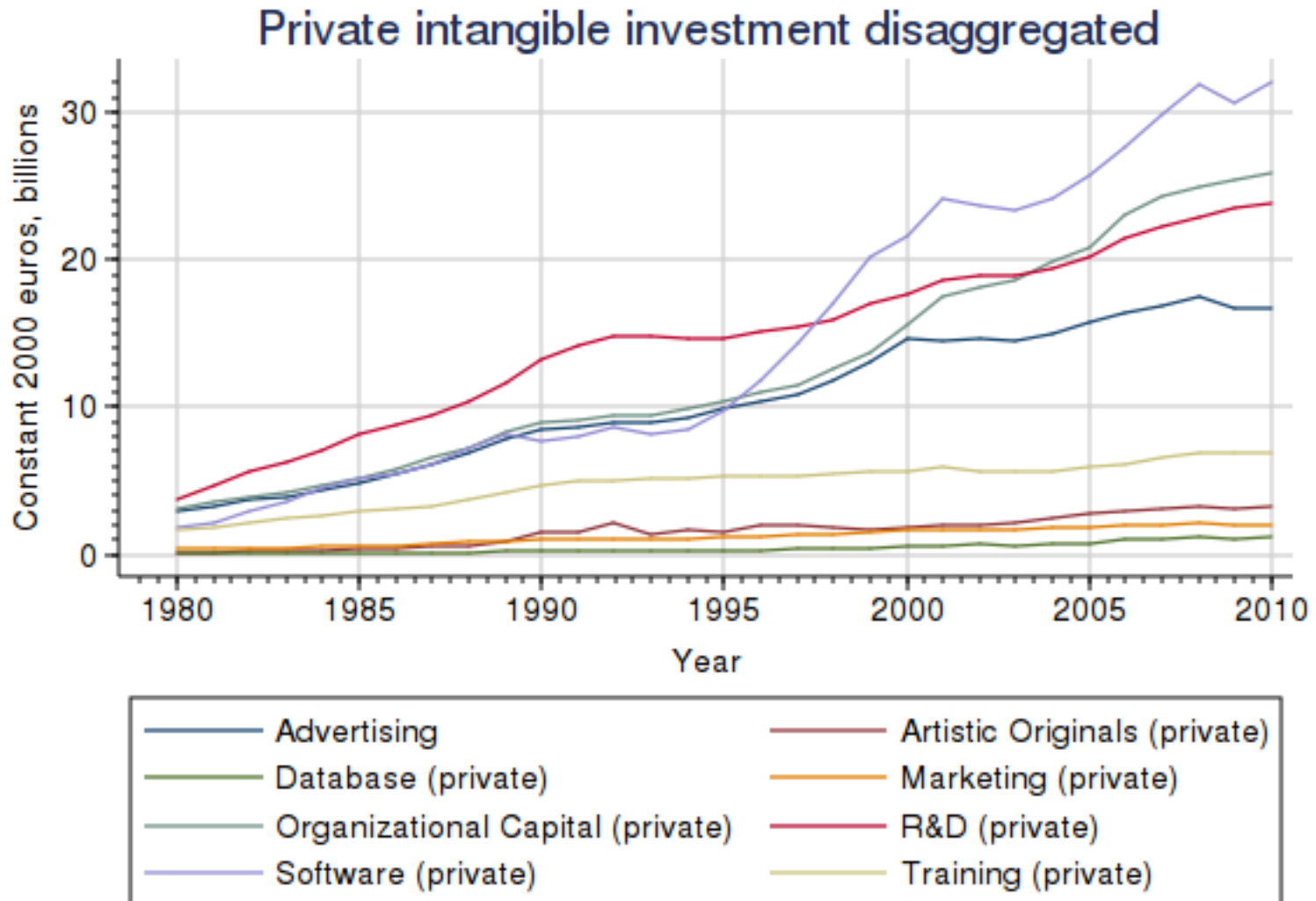
## Public vs private intangible investment



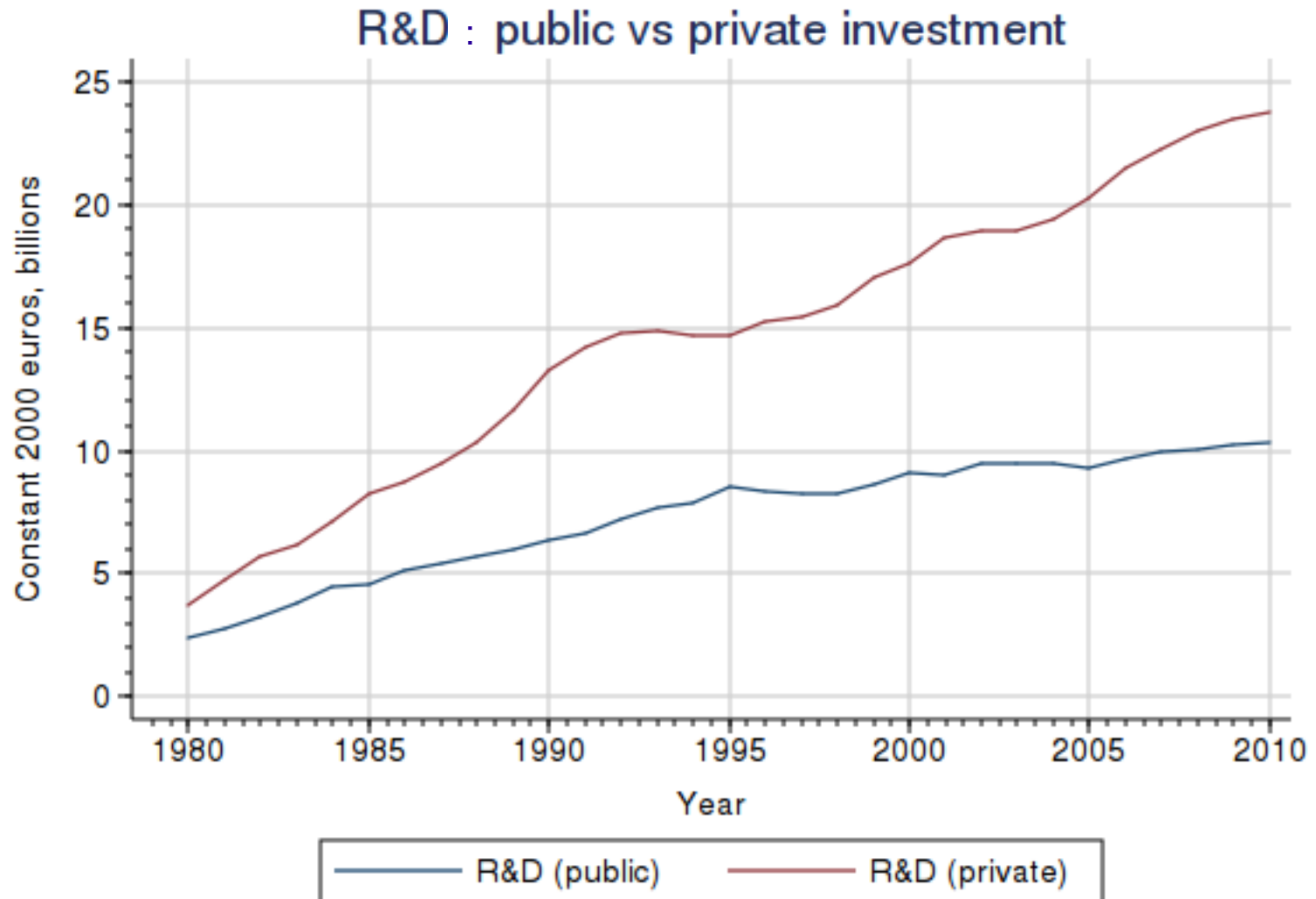
# Current situation in France



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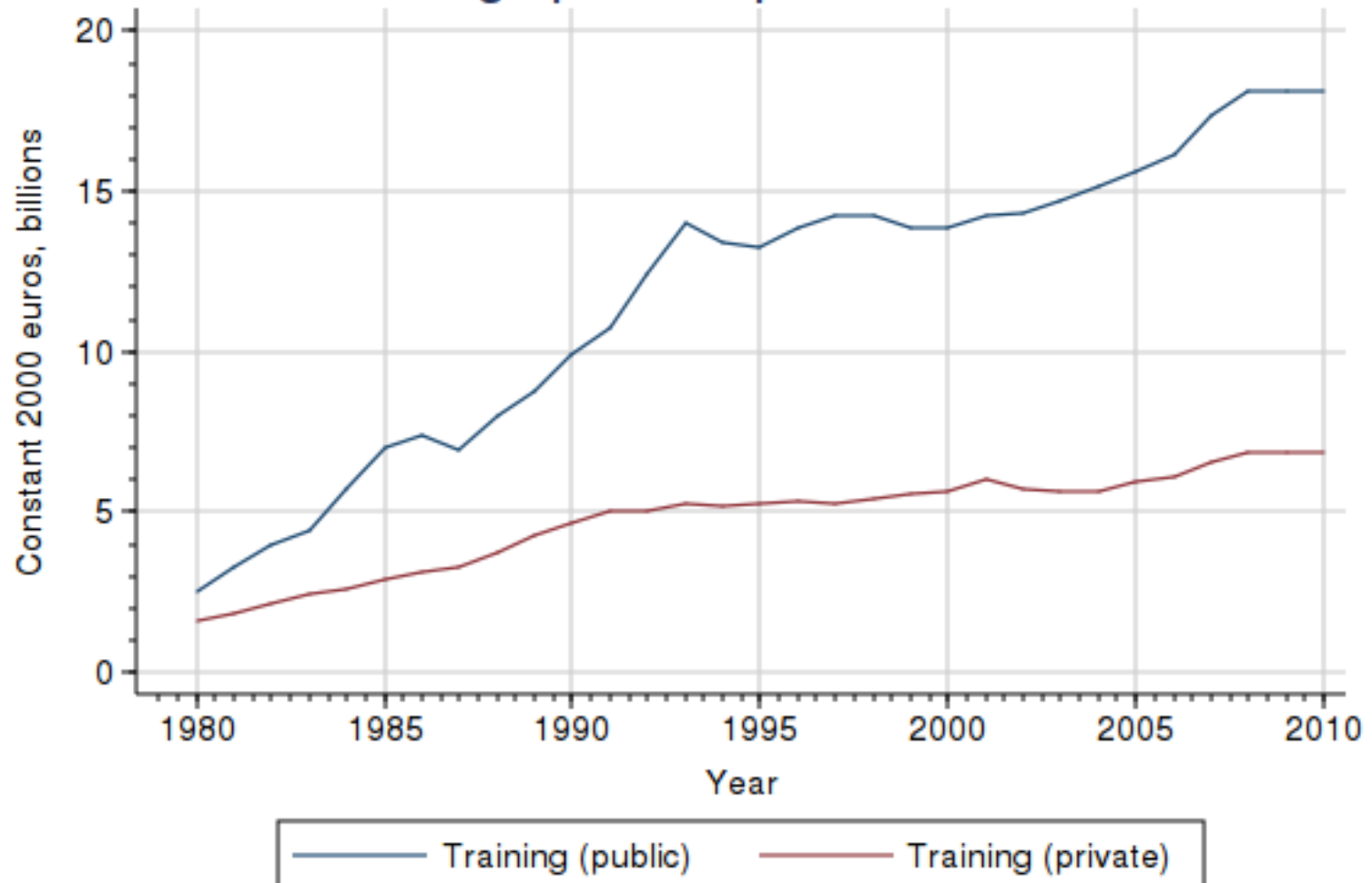
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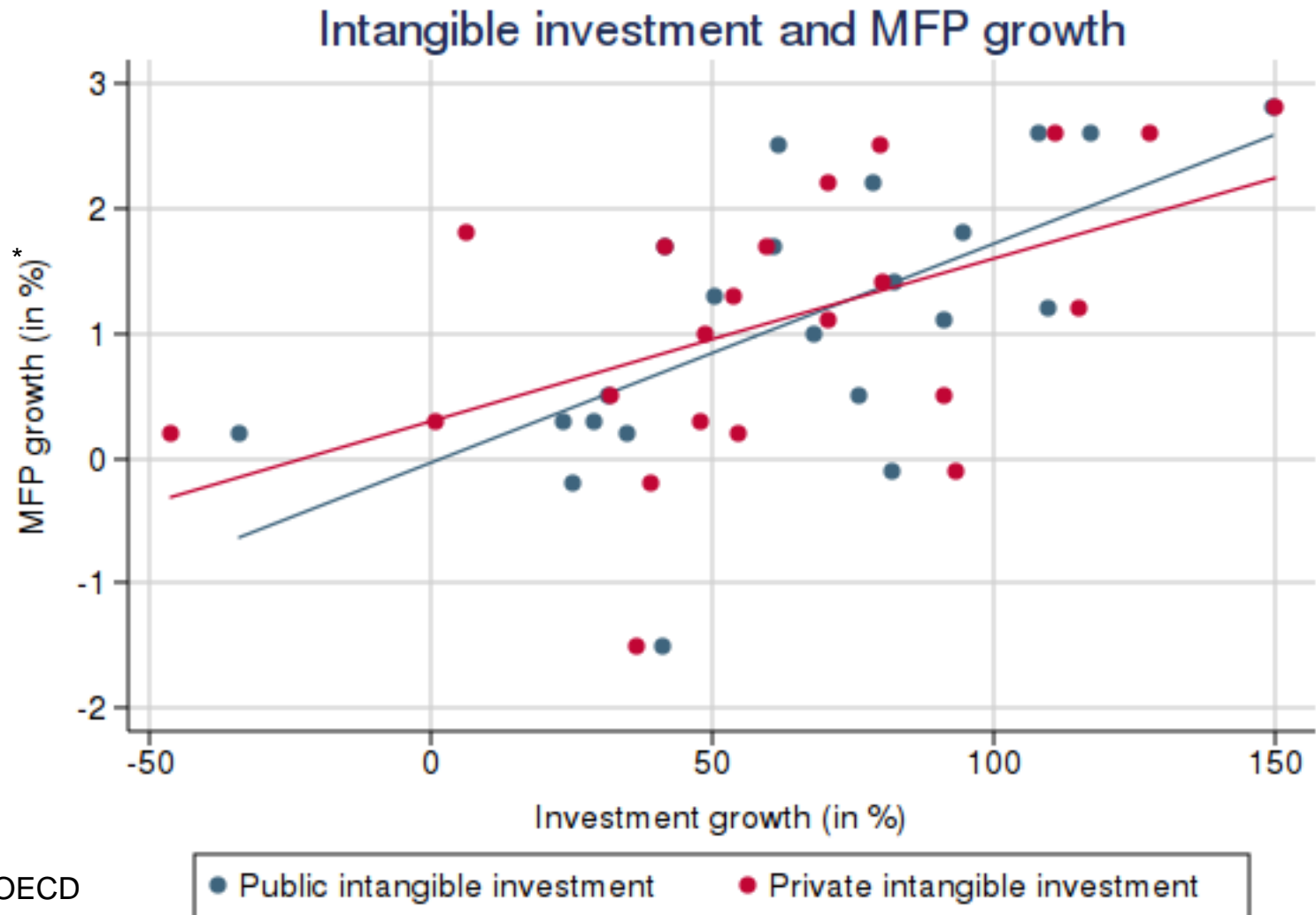
## Training : public vs private investment



# Current situation in France

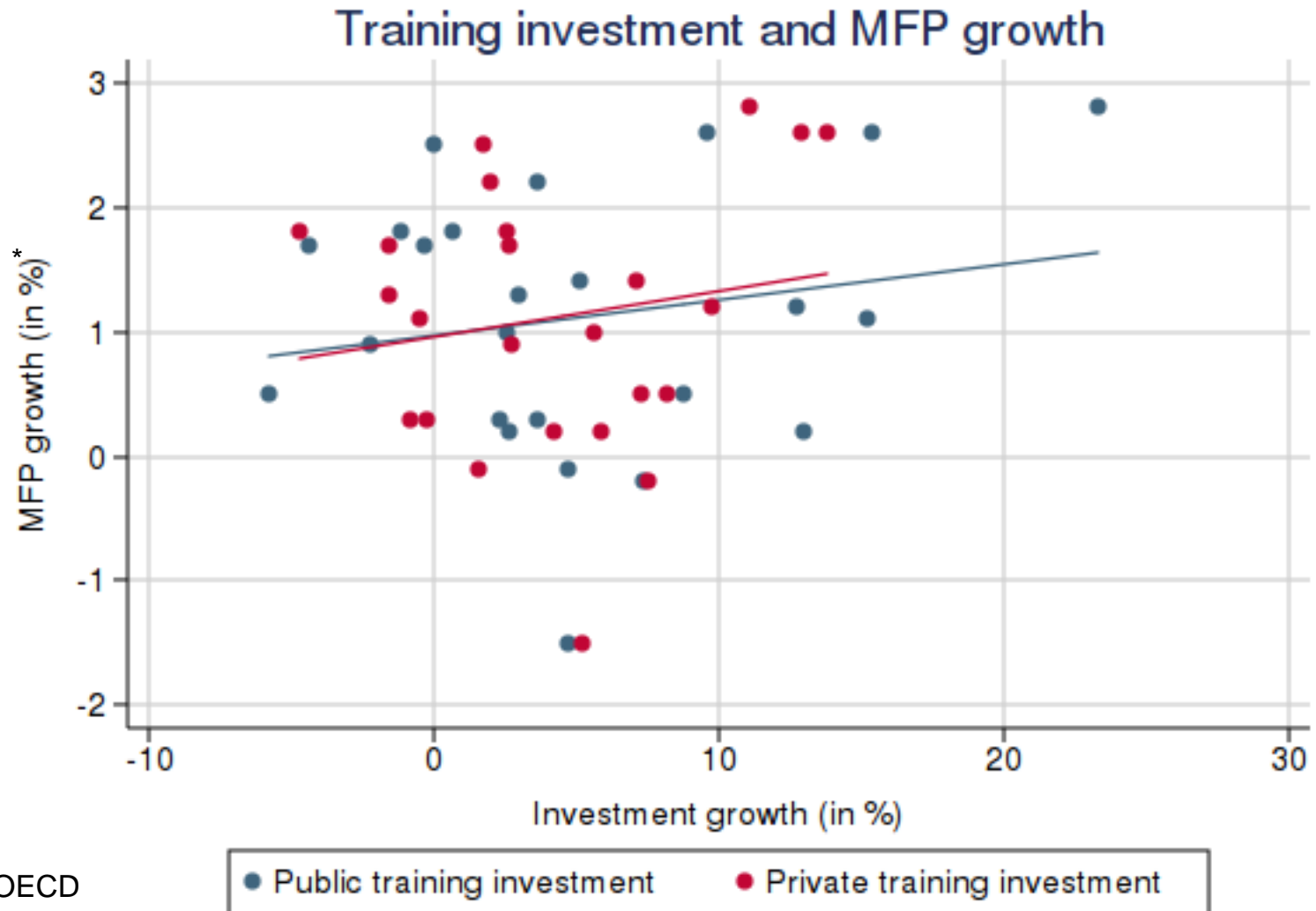
- Summary:
  - Increased role of intangible assets in the economy.
  - A decreasing proportion of investments in the public sector, with respect to the private sector.

# Intangible investment and TFP growth

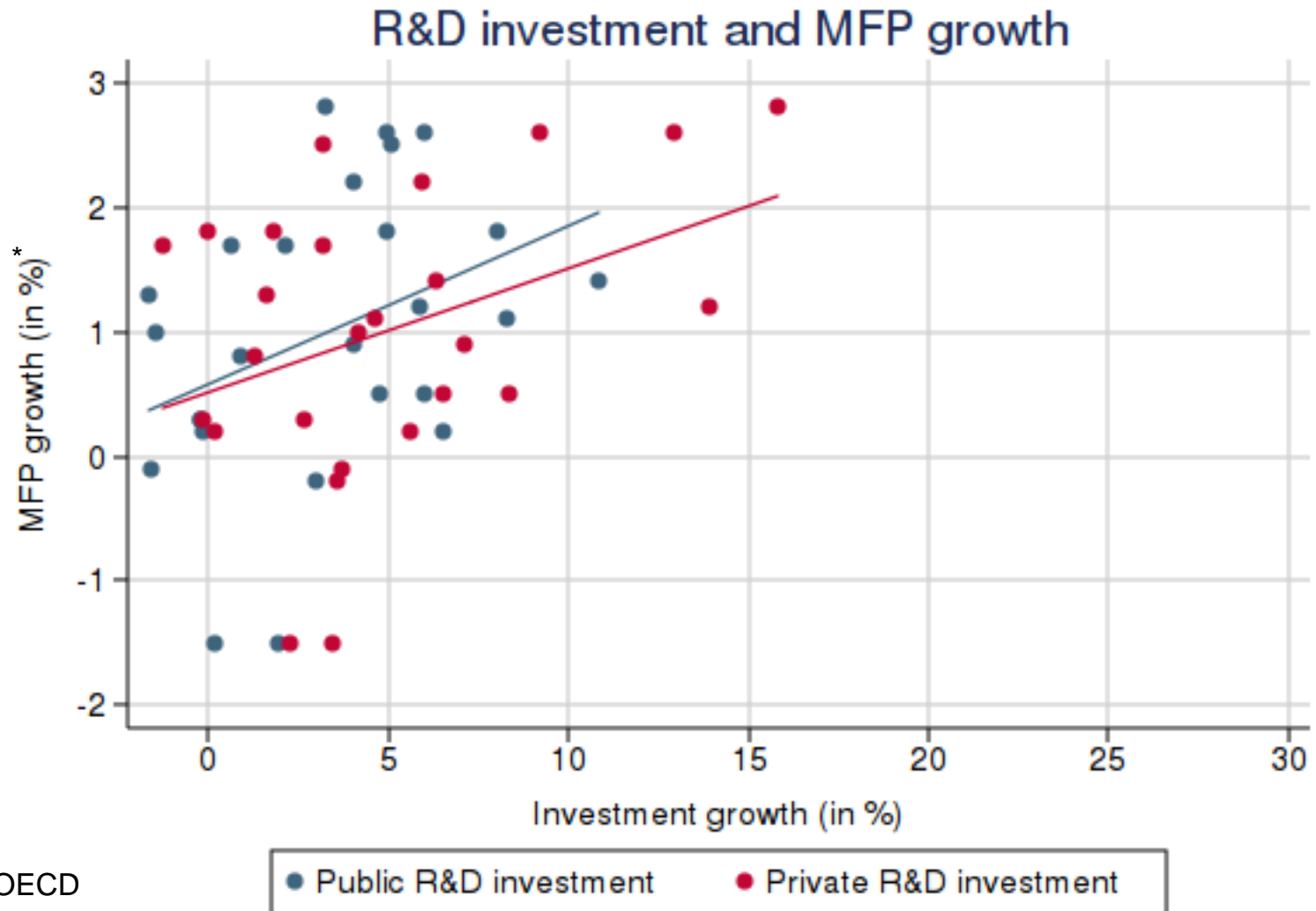


\* Source: OECD

# Intangible investment and TFP growth



# Intangible investment and TFP growth



\* Source: OECD

# The role of public intangible investment

- Estimating

$$\frac{GDP_y}{EMP_y} = \alpha PublicIntangibles_y + \beta PrivateIntangibles_y + \gamma TangibleInvestment_y + \delta T_y + \epsilon$$

Linear regression

Number of obs = 28  
 F( 4, 23) = 978.34  
 Prob > F = 0.0000  
 R-squared = 0.9885  
 Root MSE = .01506

gdp_p	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
totINTpubli~p	.0053823	.0075732	0.71	0.484	-.0102841	.0210486
totINTpriva~p	.0163299	.0075113	2.17	0.040	-.0007917	.0318681
tangtot_p	.0074827	.0392603	0.19	0.851	-.0737334	.0886989
pre1995_dummy	-.0394614	.0165249	-2.39	0.026	-.0736458	-.0052771
_cons	4.078552	.2758763	14.78	0.000	3.507859	4.649246

Private intangibles seem to be more strongly correlated with productivity, *unlike* public intangibles.

Note: variables are logarithmically transformed

# Identifying public-private complementarities

- Searching for public-private complementarities

$$\frac{GDP_y}{EMP_y} = \alpha_1 PublicAsset_y + \alpha_2 PrivateAsset_y + \alpha_3 (PublicAsset_y)(PrivateAsset_y) + \sum_{i=1}^N \beta_i OtherPrivateAsset_{i,y} + \sum_{i=1}^N \gamma_i OtherPublicAsset_{i,y} + cons + \epsilon$$

- For public-public investments:

$$\frac{GDP_y}{EMP_y} = \alpha_1 PublicAsset_{A,y} + \alpha_2 PublicAsset_{B,y} + \alpha_3 (PublicAsset_{A,y})(PublicAsset_{B,y}) + \sum_{i=1}^{N-2} \beta_i OtherPublicAsset_{i,y} + \sum_{i=1}^N \gamma_i PrivateAsset_{i,y} + cons + \epsilon$$

Note: variables are logarithmically transformed

# Public-Private Complementarities

<b>1% investment increase in this public asset</b>	<b>and 1% investment increase in this private asset</b>	<b>is associated with the following % increase in labor productivity</b>	<b>p-value</b> *** p < 0.01; ** p < 0.05; * p < 0.1
database	database	0.035	*
database	R&D	0.078	**
organizational capital	database	0.057	**
organizational capital	R&D	0.106	***
organizational capital	software	0.052	**
organizational capital	training	0.077	*
R&D	tangible	0.400	***
software	R&D	0.074	**
training	tangible	0.010	**



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# Public-Public Complementarities

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database	organizational capital	0.060	**
database	R&D	0.077	*
database	software	0.030	*
database	training	0.003	*
organizational capital	R&D	0.130	**
organizational capital	software	0.057	**
organizational capital	training	0.005	**
R&D	training	0.007	*

# Public-Public Complementarities

1% investment increase in this public asset	and 1% investment increase in this public asset	is associated with the following % increase in labor productivity	p-value *** p < 0.01; ** p < 0.05; * p < 0.1
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organizational capital	training	0.005	**
R&D	training	0.007	*

# Next steps

- Fractional polynomial method to investigate interactions between predictors (applications in clinical trials) (Royston and Sauerbrei, 2009).
- MPlgen, algorithm to fit the function:

$$Z = \beta_1 x^{p1} + \beta_2 y^{p2} + \beta_3 x^{p1} y^{p2}$$

- Where  $p1$  or  $p2$  may take the following values: -2, -1, -0.5, 0, 0.5, 1, 2, 3.
- Chooses interaction with best fit.

# Preliminary conclusions

- Measuring the contribution of public intangibles is problematic as there is no consensus regarding a measure of “public output”.
- This is a first approach seeking to test for complementary roles of public intangibles in the market economy.
- The role of intangibles is increasing in the French economy. This role needs to be further explored: Austerity measures concerning public investments may disrupt the economic recovery from the recent financial crisis.