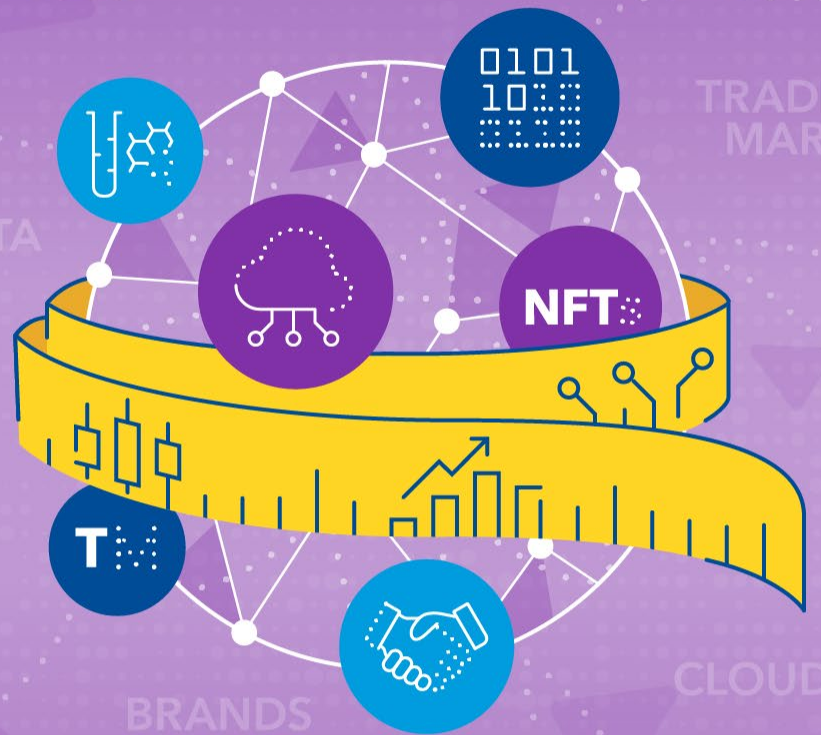


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MEASURING
THE TANGIBLE BENEFITS
OF INTANGIBLE CAPITAL



STATISTICS

Measuring profit shifting by MNEs in Italy

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Outline

- Introduction
- Empirical strategy | Overview
- Empirical strategy | Classification
- Empirical strategy | Measurement
- Data
- Results
- The role of intangibles
- Conclusion and way forward

Introduction

- Propensity Score Matching (PSM)- Receiver Operating Characteristics (ROC) is a new method to estimate Base Erosion and Profit Shifting (BEPS) by Multi-National Enterprises (MNEs) at micro level by exploiting only the information about resident business units (MNEs and domestics)
- The method contributes to the existing literature and debate from two points of view:
 - ▶ **Input of the analysis** | To use microdata referred to only resident business units allows for overcoming the issue related to the availability and reliability of worldwide firm-level information, which is currently relevant in dealing with the estimation of BEPS (for both model-based approaches and formulary apportionment)
 - ▶ **Output of the analysis** | Point measurement of BEPS at MNE-level opens the room for the application of the results in several domains, ranging from informing specific policies, to adjusting National Accounts (e.g. GDP, intangibles) and measuring Illicit Financial Flows

Empirical strategy | Overview

- PSM-ROC method is composed of two stages:
 - ▶ Classification of MNEs into tax avoiding and non tax avoiding
 - ▶ Measurement of the related amount of BEPS
- The **classification** of MNEs is based on the idea that aggressive tax planning tends to produce an “abnormal” set-up of economic variables of MNEs. This abnormality is pinned down by sequentially comparing resident MNEs with both similar domestic units (“between” comparison) and among each other (“within” comparison)
- The **measurement** is based on the idea that the amount of BEPS is connected with the distance of tax avoiding MNEs from the threshold of “normality” based on which they have been classified. For each tax avoiding MNE, BEPS is obtained by calculating the amount of profits that they should have had to declare in order to being classified as non-tax avoiding

Empirical strategy | Classification

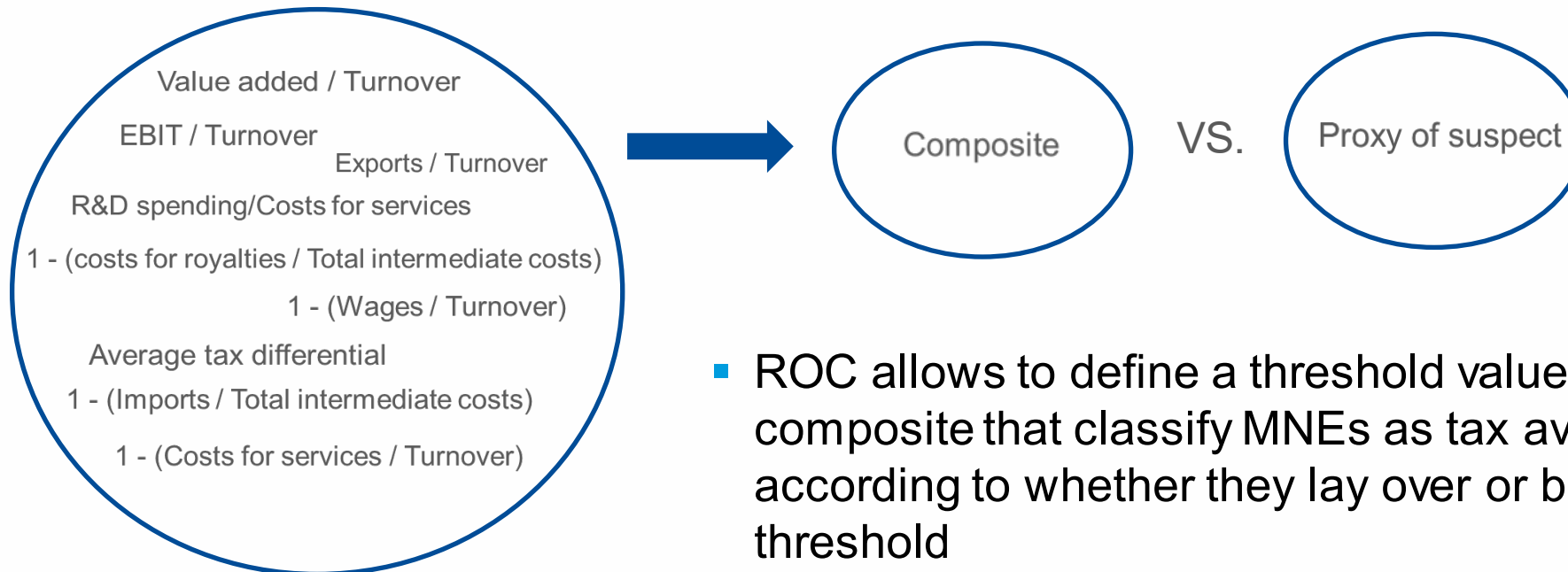
- The **between** comparison allows to identify (and interpret) the difference between the behavior of MNEs and the one of the most similar group of domestic units, thus defining a proxy of “suspect” that provides a first clustering of MNEs
- For each resident MNE, PSM identifies the control group of domestic units characterized by the highest level of similarity in terms of a set of confounding variables that should reconstruct the economic and strategic behavior of business units



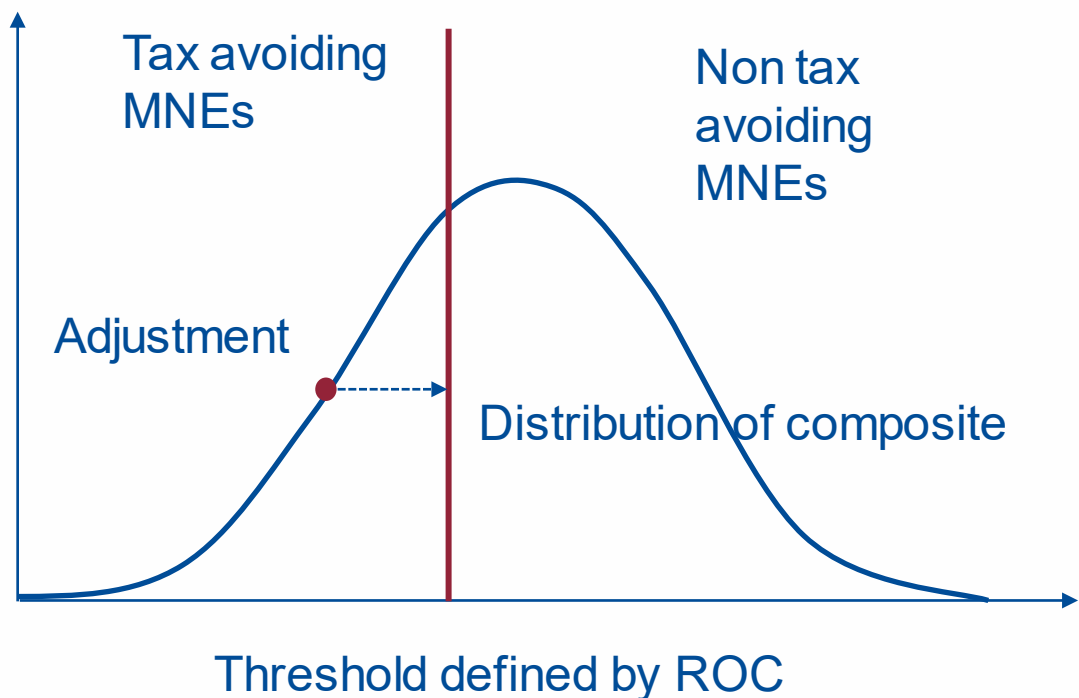
- The proxy of “suspect” is obtained by comparing the EBIT-to-turnover ratio of each MNE with the average one calculated over the related control group of domestics
 - ▶ **Proxy=1 (suspect)** if the EBIT-to-turnover ratio of the given MNE is lower than the average of the control group
 - ▶ **Proxy=0 (no suspect)** if the EBIT-to-turnover ratio of the given MNE is higher than (or equal to) the average of the control group

Empirical strategy | Classification

- The **within** comparison allows to identify (and interpret) the difference among (tax avoiding and non-tax avoiding) MNEs, thus providing the final classification
- ROC analysis is performed to define the final clustering based on the relationship between the “proxy of suspect” and a set of indicators that are intended to capture the economic and strategic behaviors as well as possible levers/drivers (i.e. royalties, R&D, trade, tax differentials) of tax avoidance



Empirical strategy | Measurement



- The measurement of BEPS is obtained by adjusting the EBIT of tax avoiding MNEs for the amount needed to bring them on the threshold defined by the ROC, thus implicitly changing their status from tax avoiding to non tax avoiding
- The amount of the adjustment depends on both sectoral (the value of the threshold) and individual (the relative incidence of the different variables in determining the value of the composite) characteristics

Data | Building-up an integrated informative set

- The dataset used along the analysis is obtained by integrating three databases produced by Istat:
 - ▶ **Frame-SBS** register that integrates administrative and survey data, and contains economic (i.e. balance sheets items) and structural (e.g. industry, size, age) information for the whole population of about 4.3 million of Italian firms
 - ▶ **TEC** (Trade by Enterprise Characteristics) register that contains information on the value of imports and exports of Italian business units by product and country of origin/destination
 - ▶ **ASIA-group** register (the Italian version of the European Group Register) that includes information on the role of resident business units within MNEs (with Italian or foreign GDC)
- For each Italian business unit (belonging or not to MNEs), this integrated dataset includes comprehensive structural and economic information, the characteristics of its international trade network and, where relevant, its position within MNEs

Data | Composition of the dataset

- Business units belonging to the same MNEs have been consolidated; business units with value added or turnover ≤ 0 and with less than 1 worker have been ruled out; business units operating in Agriculture, Financial intermediaries and Insurance have been excluded (outside the scope of SBS)

Industry	Nace Rev.2 codes	Units			Value added			Turnover			Workers			EBIT		
		% on total economy	% of MNEs in industry	% of non-MNEs in industry	% on total economy	% of MNEs in industry	% of non-MNEs in industry	% on total economy	% of MNEs in industry	% of non-MNEs in industry	% on total economy	% of MNEs in industry	% of non-MNEs in industry	% on total economy	% of MNEs in industry	% of non-MNEs in industry
Food and beverage	10, 11	1.3	0.9	99.1	3.3	44.5	55.5	4.5	46.5	53.5	2.8	27.4	72.6	3.2	45.0	55.0
Textile, wearing apparel and leather	13, 14, 15	1.3	1.3	98.7	2.8	42.5	57.5	2.5	49.7	50.3	2.7	26.2	73.8	2.5	44.1	55.9
Wood, paper and print	16, 17, 18	1.0	0.6	99.4	2.2	49.7	50.3	2.2	58.1	41.9	1.6	26.4	73.6	2.3	55.3	44.7
Chemical, pharmaceuticals, rubber and plastic, and non metallic minerals	from 20 to 23	0.8	4.0	96.0	5.2	63.6	36.4	4.8	65.1	34.9	3.1	49.9	50.1	4.8	63.6	36.4
Metals and metal products	24, 25	1.7	1.4	98.6	4.9	32.8	67.2	4.6	42.3	57.7	4.1	24.2	75.8	4.1	32.0	68.0
Electric apparel, electronics and machinery	26, 27, 28	0.8	6.7	93.3	6.5	61.7	38.3	5.9	66.4	33.6	4.5	55.6	44.4	5.1	57.7	42.3
Motor vehicles	29, 30	0.1	7.9	92.1	2.2	80.4	19.6	2.0	76.4	23.6	1.2	70.7	29.3	2.0	83.6	16.4
Other manufacturing	31, 32, 33	2.1	0.8	99.2	2.7	33.9	66.1	2.2	41.0	59.0	2.6	19.9	80.1	2.4	33.1	66.9
Energy, water and waste	from 35 to 39	0.5	3.0	97.0	3.4	36.4	63.6	3.8	46.7	53.3	1.7	20.9	79.1	4.3	42.1	57.9
Construction	41, 42, 43	12.1	0.2	99.8	7.1	14.5	85.5	5.7	23.3	76.7	8.3	7.4	92.6	7.1	12.5	87.5
Trade, transportation, accomodation and restaurants	from 45 to 56	36.2	0.5	99.5	31.3	34.2	65.8	42.5	37.3	62.7	36.1	17.4	82.6	30.8	33.2	66.8
Other business services	from 58 to 82	26.3	0.5	99.5	21.5	48.3	51.7	15.5	62.4	37.6	20.4	27.3	72.7	24.1	44.5	55.5
Personal services	from 85 to 96	15.8	0.1	99.9	7.0	16.9	83.1	3.7	21.8	78.2	10.8	9.6	90.4	7.4	9.3	90.7
Total (Percentage)		100.0	0.5	99.5	100.0	39.8	60.2	100.0	45.5	54.5	100.0	22.2	77.8	100.0	37.8	62.2
Total (MLN euro, x1000 workers)		3649558	18511	3631047	791535	314360	475272	3083425	1403004	1680421	15217	3381	11835	380431	143886	236545

Results | Classification

- Tax avoiding MNEs represents **57.5%** of Italian MNEs, ranging from 44.4% in Food and beverage to 75.7% in Construction
- The **within** comparison reduces by roughly 11 percentage points the incidence of tax avoidance with respect to the proxy of “suspect” obtained along the **between** comparison (68.4%)

Industries	Suspect confirmed	Non suspect non confirmed	Suspect non confirmed	Non suspect confirmed	Suspect	Tax Avoiding	Difference between proxy and classification
	%	%	%	%	%	%	Percentage points
Food and beverage	38.7	5.7	16.9	38.7	55.6	44.4	-11.2
Textile, wearing apparel and leather	61.5	6.6	11.0	20.9	72.5	68.1	-4.4
Wood, paper and print	54.9	7.5	13.7	23.9	68.6	62.4	-6.2
Chemical, pharmaceuticals, rubber and plastic, and non metallic minerals	40.5	10.8	16.7	32.0	57.2	51.2	-6.0
Metals and metal products	46.6	11.6	15.8	26.0	62.4	58.2	-4.2
Electric apparel, electronics and machinery	48.5	8.7	15.1	27.8	63.5	57.1	-6.4
Motor vehicles	49.0	4.2	18.0	28.8	67.0	53.3	-13.7
Other manufacturing	44.0	8.7	22.0	25.3	66.0	52.7	-13.3
Energy, water and waste	52.9	11.8	5.4	29.9	58.3	64.7	6.4
Construction	61.3	14.4	8.4	15.8	69.8	75.7	6.0
Trade, transportation, accommodation and restaurants	48.9	5.2	20.8	25.1	69.7	54.1	-15.6
Other business services	55.3	4.8	18.6	21.4	73.8	60.1	-13.8
Personal services	46.8	2.1	30.4	20.7	77.2	48.9	-28.3
Total	50.6	6.9	17.8	24.7	68.4	57.5	-10.9

Results | Measurement

- According to the method, BEPS amounts to **25.9** billion euros, representing **1.4%** of the Italian GDP at current prices in 2019
- The overall incidence of BEPS in terms of EBIT is **15.2%**, about **1.4** million euros per MNE
- The incidence of BEPS also shows a strong sectoral heterogeneity, ranging from 46.1% in Construction to 4.7% in Motor vehicles

Industries	Declared EBIT	Adjustment	Incidence of adjustment	Adjustment per MNE
	<i>MLN euros</i>	<i>MLN euros</i>	<i>%</i>	<i>MLN euros</i>
Food and beverage	5421.7	1490.0	21.6	3.5
Textile, wearing apparel and leather	4172.4	622.0	13.0	1.0
Wood, paper and print	4824.3	565.1	10.5	2.5
Chemical, pharmaceuticals, rubber and plastic, and non metallic minerals	11604.4	1974.3	14.5	1.8
Metals and metal products	5035.5	2499.8	33.2	2.8
Electric apparel, electronics and machinery	11117.7	3342.1	23.1	1.7
Motor vehicles	6244.8	309.7	4.7	1.0
Other manufacturing	3055.0	464.4	13.2	0.8
Energy, water and waste	6813.6	5798.3	46.0	11.6
Construction	3395.5	2899.0	46.1	2.7
Trade, transportation, accommodation and restaurants	38865.7	2287.4	5.6	0.4
Other business services	40705.1	3079.7	7.0	0.7
Personal services	2630.4	541.8	17.1	1.0
Total	143886.1	25873.5	15.2	1.4

Results | Countries

- Results can be broken down according to the location of the GDC of MNEs
- MNEs with GDC in **Italy** generate **16.6** billion euros of BEPS (64.1% of the whole amount)
- **5.3** billion euros (20.5%) are related to MNEs with GDC in other relevant **EU countries** (mainly, France, Germany and the Netherlands).
- MNEs with GDC in the US and China generate about 1.1 billion euros of BEPS, while 0.6 billion euros are generated by MNEs with GDC in UK

Country of the headquarter	Tax avoiding MNEs		Adjustment	
	<i>Units</i>	<i>%</i>	<i>MLN euro</i>	<i>%</i>
Italy	8315	44.9	16575	64.1
Germany	1678	9.1	1586	6.1
France	1061	5.7	2020	7.8
Spain	420	2.3	87	0.3
Ireland	116	0.6	139	0.5
Luxembourg	591	3.2	505	2.0
The Netherlands	686	3.7	880	3.4
Belgium	187	1.0	95	0.4
UK	1105	6.0	588	2.3
USA	970	5.2	1108	4.3
China	1165	6.3	1149	4.4
Japan	204	1.1	276	1.1
ROW	2013	10.9	864	3.3
Total	18511	100.0	25873	100.0

The role of intangibles | Strategy

- In all industries non tax avoiding MNEs show a lower incidence of royalty payment on total costs with respect to tax avoiding MNEs
- Other business activities (0.84), Motor vehicle (0.94), Other manufacturing (0.94), Chemical and others (0.95) show the highest differential between tax avoiding and non tax avoiding MNEs
- Considering a further breakdown: higher value for Chemicals and Pharmaceuticals (0.904), Furniture (0.774), Wholesale and Retail trade (respectively 0.947 and 0.859), Broadcasting (0.910), Software production (0.754) and Informatics (0.954)

Industry	Royalty payment <i>Value of non tax avoiding MNEs vs. tax avoiding MNEs</i>
Food and beverage	0.987
Textile, wearing apparel and leather	0.978
Wood, paper and print	0.991
Chemical, pharmaceuticals, rubber and plastic, and non metallic minerals	0.954
Metals and metal products	0.987
Electric apparel, electronics and machinery	0.964
Motor vehicles	0.937
Other manufacturing	0.945
Energy, water and waste	0.947
Construction	0.996
Trade, transportation, accomodation and restaurants	0.951
Other business services	0.837
Personal services	0.976
Total	0.941

The role of intangibles | Countries

- The incidence of royalty payment of MNEs with respect to total average is heterogeneous by country of GDC
- Ireland (5.7 times the average), Belgium (3.8), Spain (3.4) and Germany (2.2) show the highest differentials
- Japan (0.6), France (0.6), Italy (0.75) and China (1.0) show the lowest differentials

Country	Difference with respect to total average
Italy	0.749
Germany	2.188
France	0.640
Spain	3.437
Ireland	5.704
Luxembourg	1.293
The Netherlands	1.178
Belgium	3.798
UK	1.580
USA	1.870
China	1.012
Japan	0.630
ROW	1.236

Conclusion and way forward

- PSM-ROC method represents a novelty and permits a significant step forward in the existing literature
- By using only the information related to resident business units (MNEs and domestics), it allows for overcoming the constraint represented by the lack of (complete and reliable) worldwide microdata
- It provides firm-level point estimates of BEPS, thus permitting to analyze the relationship between the economic (and institutional) context and MNEs' behaviors at micro, instead of at meso or macro level
- Micro estimates open the door for the use of results in at least three main fields:
 - ▶ To inform policies based on the profiling of MNEs with respect to their specific characteristics
 - ▶ To measure related IFFs in terms of the SDG monitoring indicator of 16.4.1
 - ▶ To improve the exhaustiveness and precision of some relevant aggregate of NA (GDP, GNI) further than the trade of intangibles

Thank you.
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