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Revisiting the investment income balance. What makes some EU countries different?¹

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Revisiting the investment income balance. What makes some EU countries different? (Duncan van Limbergen)¹

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Abstract

The investment income balance of EU countries varies widely, with sizeable outliers often not explained by conventional fundamentals such as the external asset stock. At the same time, tax rules in a number of EU Member States can be used for Aggressive Tax Planning (ATP) by companies, which may be associated with their investment income balance outturns. By comparing EU countries potentially exposed to ATP behaviour to other EU Member States, we determine which time-varying features, likely associated with incidence of ATP behaviour, make these countries different. Therefore, we study various macroeconomic and other variables and use Principal Component analysis to create a "dissimilarity score", which marks a significant difference between the countries potentially exposed to ATP and other countries. The dissimilarity score can help explaining current account developments.

1. Introduction and motivation

Studies aimed at explaining current account developments, which are important for the external sustainability analysis, use a set of conventional factors such as the net external asset position and GDP per capita (Coutinho at al, 2018). However, for a few EU countries, a considerable part of their current account balance dynamics remains unexplained by the standard explanatory variables, as some of their specific characteristics are not accounted for. At the same time, according to the European Commission's Country-Specific Recommendations (CSRs) from 2019 and 2020, some of these countries' tax rules can be used for Aggressive Tax Planning (ATP) by companies, including tax rules in Cyprus, Hungary, Ireland, Luxembourg, Malta and the Netherlands.² This may lead to substantial activities and transactions of multinational enterprises (MNEs), which may have only weak links to local real economic activity in these countries, but may strongly affect their (external sector) macroeconomic statistics. The goal of this paper is to identify a set of time-variant markers that should capture the specific characteristics of such countries, potentially exposed to ATP.³

¹ I thank Goran Vukšić and Stefan Zeugner for valuable cooperation on the paper.

² For 2019 CSRs please see: <u>https://ec.europa.eu/info/publications/2019-european-semester-country-specific-recommendations-commission-recommendations en</u>,

and for 2020 CSRs please see: <u>https://ec.europa.eu/info/publications/2020-european-semester-country-specific-recommendations-commission-recommendations_en</u>.

We note that in many instances, the CSRs recognise measures taken by these countries against the risk of ATP, but generally find that further steps are needed to fully address the features of their tax systems that facilitate ATP, and which can vary across the six Member States. European Commission (2017) provides a detailed analysis of ATP indicators.

³ In this text, we use the terms 'countries exposed to ATP', 'countries vulnerable to ATP', or simply 'ATP countries', to describe the countries whose tax rules can be used for ATP according to CSRs, but also generally the countries whose tax codes are seen as possibly facilitating ATP.

Current account balances vary widely across EU countries, with the investment income balance sometimes being an important driver. Moreover, investment income balances are persistently in deficit in a certain set of EU Member States. These countries can be broadly divided into two groups. The first group consists of catching-up countries, which are mostly Central and Eastern EU economies. The second group comprises countries found by the European Commission to have tax rules that can be used for ATP practices, which, in general, may be related to profit shifting by MNEs, often using Special Purpose Entities (SPEs).

Figure 1 shows the investment income balances over a longer term for 28 EU countries. Examples of the catching-up group are the Czech Republic and Slovakia, with a long-term average income deficit of 6% of GDP. This is broadly comparable in size to deficits in countries exposed to ATP, such as Malta and Luxembourg (with income deficits of respectively 5% and 9% of GDP on average).⁴

While both groups of countries are characterised by persistent deficits, the reasons for deficits across the groups differ. In the catching-up economies, foreign-owned firms move into an economy and engage in real economic activities, such as establishing production facilities in order to benefit from, among other factors, relatively cheaper labour, or from market access in non-tradable sectors. Their business activities in the host economy usually require substantial local labour inputs, depending on the exact labour intensity of their activities. Subsequently, the profits of foreign-owned firms are repatriated to the home economy, which lowers the income balance and the current account via income outflows on foreign liabilities.



Figure 1: Investment income balance, % of GDP (average 2005-2018)

Source: Eurostat.

Note: Yellow bars pertain to countries exposed to ATP. Data for Cyprus are missing in 2005, 2006 and 2007.

In contrast, in many countries vulnerable to ATP, foreign investments often have only very weak links to the local real economy and are likely to be largely motivated by tax planning. In such economies, the difference between the yield on external assets and external liabilities may be

⁴ Note that the Netherlands is somewhat different in this respect, despite being considered a country exposed to ATP – it recorded a long-term average investment income surplus.

artificially low due to profit shifting, as transfer pricing and other practices increase returns on external liabilities and depress the yield differential (see e.g. Tørsløv et al, 2018; Vicard, 2019). Indeed, as profits are shifted to the ATP country, often in ways that do not immediately affect the investment income account, and subsequently repatriated to the parent company, an investment income deficit emerges.⁵

Figure 1 also shows that the Netherlands and to some extent Cyprus, record different average values of investment income balance from other countries exposed to ATP, as well as from catching-up economies. Thus, the group of ATP countries may also be quite heterogeneous in some important aspects, which are unlikely to be well captured using a single indicator. Even if one would fully rely only on the tax planning aspects to account for differences across countries, using only a single variable, such as statutory corporate income tax (CIT) rate, would hardly be sufficient. As noted by Crivelli et al (2015), the attractiveness of tax rules in some countries does not stem only from possibly lower tax rates – the statutory tax rates actually need not be (much) lower than in other countries. Other aspects of the special tax regimes and arrangements also matter, including the possibility of taking advantage of potential loopholes using innovative tax engineering techniques (Damgaard et al, 2019a). Most of these additional aspects are, however, very difficult to measure with the available data.

Still, results from the related research indicate some of the potential candidate variables that might be useful in identifying specific characteristics of countries exposed to ATP and building an ATP incidence indicator. For example, Damgaard et al (2019b) try to decompose total FDI into *real* and *phantom* investment, with the latter defined as investments into empty corporate shells (i.e. SPEs) with no, or with very weak links to the local real economy. They find that phantom investment accounts for nearly 40% of total global FDI in 2017, growing from around 30% in 2009, and that these are largely hosted by ATP countries, most notably Luxembourg, the Netherlands and Ireland (out of EU countries vulnerable to ATP). One should note, however, that also this type of investment has some, although weak links to local economy, which may be quite specific, such as relatively high demand for services of local lawyers or accountants, as compared to other local inputs. Thus, in order to identify distinct features of EU ATP countries, we use, among others, proxies for the real activities of MNEs in host economies and the characteristics of the local economy that may be related to the specific types of MNEs' local activities. In a similar way, using insights from other related research as well as stylized facts about ATP countries' shared characteristics, we choose a number of variables (presented in the next section) that could be helpful in identifying the ATP incidence.

We focus on the investment income balance and on the above observation in Figure 1 showing large investment income deficits in most EU ATP countries over a longer period. That the investment income balance has gained importance as a driver of the current account balance is to large extent related to the build-up of gross external asset and liability positions over recent decades, which have been driven also by profit shifting and SPEs (Adler et al, 2019; Damgaard et al, 2019b). While in some cases this item may be large, it can be (partly) offset in the overall

⁵ The three forms of profit shifting used by MNEs include i) transfer pricing, i.e. manipulation of intra-firm exports and import prices; ii) profit shifting using intra-group debt, i.e. interest payments; and iii) (re-) locating intangible, income-generating assets to a country whose tax system may facilitate ATP, including e.g. patents, algorithms, or financial portfolios (Tørsløv et al, 2018). Heckemeyer and Overesch (2017) provide a survey of empirical literature on profit shifting and conclude, inter alia, that non-financial shifting techniques are the dominant methods.

current account. This is true for both country groups with investment income deficits identified above.⁶

This paper aims to pinpoint which variables are related to the investment income deficit and which variables differentiate between EU countries labelled as countries exposed to ATP and others. Indeed, as the deficit emerges in two sets of countries, we should be able to find markers that have a similar effect on the investment income balance for the two groups, and markers which differentiate between catching-up countries and ATP countries. The aim is to find specific markers for the latter group. Our work is related to the literature on finding indicators of countries with tax systems potentially facilitating ATP behaviour, such as European Commission (2017). As we test for the importance of a number of markers, also the heterogeneity within the group of EU ATP countries can potentially be explained.

Partly, this research is the mirror image of the debate on excess returns on foreign assets, i.e. higher returns on net external assets than explained by conventional standards. Indeed, a longstanding debate in the literature pertains to excess returns or the "exorbitant privilege" a country like the US enjoys on its foreign assets, contrary to e.g. the euro area (e.g. Habib, 2010). The debate on these excess returns leads to diverging explanations ranging from risk-taking and dollar dominance to profit shifting (Setser, 2018 and Wright and Zucman, 2018). Bruner et al (2018) follow the latter explanation and estimate US foreign income to be inflated by 1/3rd due to profit shifting. EU countries are major counterparts for these profit shifting operations, as evidenced by profit repatriation flows following the US tax reform in 2017 (CBI, 2018). This paper thus takes the opposite perspective and looks at economies with potentially unexplained investment income deficits. In other words, we look for the excess negative returns given certain economic fundamentals, such as the net international investment position (NIIP).⁷

The remainder of the paper is structured as follows. Section 2 gives a data overview and explains the various markers used to build an ATP score. Section 3 presents the methodology and results, while section 4 concludes.

2. Data overview

We select markers that explain the investment income balance, which can be classified in two groups. The first group captures conventional determinants, such as the NIIP or the foreign-owned share of gross value added. Indeed, a higher NIIP or less foreign-owned share of value added should increase the investment income balance (e.g. Alberola et al, 2018).

The second group consists of less conventional markers with the aim to capture specific characteristics of countries exposed to ATP. These markers relate to MNEs (e.g. merchanting) and SPE (e.g. gross financial asset ratios) activity, but also to statistical discrepancies (such as the difference between trade balances calculated using different methodologies). Corporate

⁶ For the catching-up economies, an income deficit is often offset by a trade surplus in goods. This may hold true also for the countries vulnerable to ATP, if foreign investors engage in profit shifting to these locations using transfer pricing in intra-firm international trade transactions. This would increase the host countries trade balance, while lowering its investments income balance. Similarly, the intangible assets relocated to an ATP country by foreign investors may lead to higher exports (of services) from that ATP country (see e.g. IMF, 2018, for the case of Ireland).

⁷ Related to our perspective, Knetsch and Nagengast (2017) dissect the seemingly low investment income on Germany's external assets by analysing the individual components (yield level effect, portfolio composition effect and net stock effect).

offshoring may affect current account data via numerous channels, such as overestimation of exports and accompanying divergence between trade flows records based on varying methodology (BIS, 2018). In addition, we observe a striking correlation between production and sales abroad (i.e. merchanting and contract manufacturing) and large investment income deficits in some ATP countries. This is the case in Ireland (IMF, 2018). As Adler et al (2019) put forward, the activity of merchanting can both capture "true" merchanting and profit shifting. The latter form would coincide with higher income outflows.

Data sources include Eurostat, IMF, OECD, World Bank and ZEW. Data is not always available for all countries and in some cases the time span is limited, often caused by a change in definition (BPM5, BPM6) or a change in the survey method.

Conventional markers

- *Net international investment position (NIIP):* in theory, a higher NIIP should lead to an increase of the investment income surplus. Expressed in % of GDP.
- Share of domestic value added in gross exports: This marker aims to capture the position of the country in the value chain structure. A country which is higher up in the value chain uses more domestic value added in the own gross' exports. More domestic value added in the exports in principle entails less foreign ownership of the domestic capital stock and production. It is thus less dependent on foreign firms, which usually repatriate profits out of the economy back to the headquarters, thereby lowering the income balance and current account balance (Brumm et al, 2019). As such, this marker should be positively correlated with the income balance and current account balance. In principle, this marker is unrelated to ATP behaviour.
- *Foreign-owned share of gross value added:* When a higher share of the gross value added realized in an economy is accounted for by foreign-owned production factors, we expect bigger profit repatriation. As such, a higher degree of foreign ownership should negatively correlate with the income balance. Note that this is in line with the NIIP rationale, where income outflows are linked to external liabilities. This correlation should in principle not depend on the country being exposed to ATP or not, and thus be a comparable marker for both sets of countries. Yet, in case MNEs engage in profit shifting, for instance via transfer pricing, income outflows may be outsized (Tørsløv et al, 2018). As a proxy for the marker, we use the foreign-owned share of the gross operating surplus, available in the FATS database (Statistics on the structure and activity of foreign affiliates) in Eurostat.

ATP markers

• *Merchanting:* Merchanting is goods trade that does not cross the border of the firm's resident country. The difference between receipts from goods sold abroad and expenses for goods purchased abroad is recorded as net exports of goods in the Balance of Payments of the firm's economy (Beusch et al, 2017). Merchanting is often sizeable in smaller, open economies hosting many MNE headquarters, such as Sweden (Riksbank, 2017). It is a phenomenon that alters the current account in possible significant ways, for example by having a substantial upward effect in the Swedish case. At the same time, significant merchanting revenues are prevalent also in countries that are generally considered to have tax systems potentially facilitating ATP behaviour, such as Luxembourg and Ireland. In this vein, Adler et al (2019)

put forward that merchanting activity can capture both "true" merchanting as well as profit shifting. Expressed in % of GDP.

- *BoP G1-FTS difference:* Trade statistics are recorded according different methodologies. This variable captures the difference between the G1 entry in the Balance of Payments (BoP), which indicates the "general merchandise" trade balance⁸ and the merchandise trade balance under the Foreign Trade Statistics (FTS) rules. The BoP method focuses on international transactions, while FTS is based on the declaration of external trade. The FTS data only records goods trade that crosses the country's own physical borders, while the BoP method also includes international transactions which involve transactions outside the country's own borders. An example of the latter is contract manufacturing, where goods are produced overseas on behalf of a firm (in the resident economy) which holds blueprints or Intellectual Property assets. This variable can loosely be regarded as a proxy for the globalization of an economy and its current account. A bigger G1-FTS difference (thus, a higher value for the marker) indicates that a higher share of a country's net exports are realized outside of its borders. The BoP G1-FTS difference can correlate with ATP incidence if it reflects MNE offshoring via e.g. contract manufacturing arrangements, such as in the case of Ireland (Department of Finance, 2019).
- *Gross external assets and liabilities:* countries with tax systems that may facilitate ATP behaviour are often associated with unconventionally high external asset and liability positions (EC, 2017 and Van 't Riet and Lejour, 2018). As these countries often exhibit investment income deficits, we expect a negative correlation between this marker and the income balance. The correlation for other countries should in principle be less clear. Yet, a relatively high gross external asset position may also indicate a "leveraged investor" position, which could correlate with a higher income surplus if the investing country takes on more risk. Expressed in % of GDP.
- *Direct investment share in foreign assets:* Profit shifting and phantom investments, such as those channelled via SPEs, often take the form of direct investment (Damgaard et al, 2019a). A higher share of direct investment in the total foreign asset composition may thus correlate with ATP incidence and a lower income balance. Conversely, *genuine* direct investment may yield a higher return than other types of investment such as portfolio-held. Insofar the higher relative return holds, a higher share of direct investment may correlate with a higher relative investment income balance.
- *Statutory corporate tax rate:* One of the potentially most important aspects of the ATP is low corporate tax rates. In principle, a higher domestic tax rate could increase the investment income balance due to profit shifting, as production and assets are shifted to the low-tax country and subsequently repatriated back via income account. The investment income balance should thus be positively correlated with the tax rate. For relatively high-tax countries such as the US and France, this is evidenced by Setser (2018), Wright and Zucman (2018) and Vicard (2019). Dowd et al (2017) show that the elasticity of MNE profits to tax changes is disproportionally high in low-tax countries.
- *Effective average tax rate (EATR):* The effective average tax rate is often used to consider discrete investment choices for (mutually exclusive) hypothetical investment projects across potential locations. It is measured by the proportion of total income taxed away in specific locations (see European Commission, 2019, pp. 296-297; more details of calculation methodology are available in Devereux and Griffith, 1999). In principle, this variable should

⁸ Merchanting and "branding and non-monetary gold" are not taken into account.

better capture the true taxation than the statutory tax rate. However, effective (average) tax rates should be more relevant for investment-location decisions of investors, while MNE's decisions on where to report generated profits is likely to be determined primarily by the statutory tax rates (Deveraux, 2007). The two rates are positively and relatively strongly correlated. Again, we expect the correlation with the investment income balance to be positive in case of profit shifting and repatriation.

- *Share of corporate tax revenue in total tax revenue:* countries with tax systems possibly facilitating ATP generally collect more of their total tax revenue from corporate taxes (Tørsløv et al, 2018). As such, there should be a negative correlation between this marker and the income balance. As the government collects a larger share of tax revenue from corporations (a possible indication of higher ATP incidence), the income balance should decrease.
- *Lawyer prevalence:* This indicator aims to capture relative overrepresentation of lawyers and accountants in a country, based on their employment share in a country's total employment. Data are collected from the detailed Labour Force Survey in Eurostat. More lawyers and accountants as share of total employment could for instance indicate a higher degree of shell firms or SPEs in an economy. Indeed, one of the few "real" economic effects of SPEs in an economy is higher employment of lawyers. In order to correct for the need of more lawyers due to a relatively complex legal system and relatively less rule of law, we divide the lawyer/employment ratio by the World Bank Rule of Law indicator. The Rule of Law score (indicating a more efficient legal system and lower demand for lawyers) should even out relative overrepresentation of lawyers in countries with less efficient legal systems. As a result, a higher number indicates an elevated presence of lawyers and accountants (controlled for legal system efficiency) which may be linked to more SPE activity in an economy and indicate ATP incidence.
- *Share of legal activities in gross value added:* The rationale for this variable is similar to the lawyer prevalence indicator. In this alternative, the share of the "legal and accounting activities, head office activities and management consultancy activities" in an economy's gross value added proxies prevalence of legal and accounting activities. A higher number could be an indicator for elevated SPE activity in an economy.
- *Retained earnings balance:* The trade balance on retained earnings may serve as a proxy for ATP incidence if foreign-owned firms retain an outsized amount of profits, for example in a low-tax economy. In that case, a large deficit on FDI retained earnings occurs. An example of this is the retaining of profits by US MNEs in EU economies, linked to the tax treatment of foreign profits before the 2017 UX tax reform (CBI, 2019).
- *Turnover per person employed in foreign-controlled firms:* An unconventionally high turnover/worker number in foreign-owned firms may be an indicator for profit shifting to countries with tax rules that can be used for ATP. In this case, profits are shifted to low-tax economies, where turnover increases on paper while profits are repatriated in turn. This indicator should correlate positively with ATP incidence and lower the income balance. The data source is FATS (see above).
- *Specific services trade balances:* Profit shifting can be realized by strategic placement of e.g. Intellectual Property (IP) assets and corresponding royalty flows (EC, 2017). If this is the case, outsized income flows (i.e. a higher trade imbalance in percentage of GDP) can indicate higher ATP incidence. Two subcategories of services trade balances are considered: "other business services" and "charges for the use of intellectual property". Instead of the trade balance, one can also consider gross credit or debit flows.

- *Ratio of financial flows to real trade flows:* A strong prevalence of financial flows over real trade flows may indicate widespread ATP behaviour (Avdijiev et al, 2018), for example via the outsized role of MNE profit shifting and SPEs in an economy. Avdijiev et al show that this ratio can be five times higher in financial centres compared to the all-country sample.
- *Current account fit:* This is the fitted current account value from the regressions in Coutinho et al (2018).

To conclude, we present an overview of several markers, where we highlight data outliers (red cells in Table 1). These outliers are based on the long-term average of the marker being larger than median plus one standard deviation of the unweighted EU average. This approach allows for a first ordering of EU countries by ATP incidence. Ireland, Cyprus and Luxembourg show up as largest outliers with five or more markers deviating from the EU median. Malta and the Netherlands also display potential ATP incidence with more than two highlighted markers.

Long-term avg of:	BE E	BG (cz c	ок с	DE E	E	IE I	EL E	ES F	R H	IR I	т	CY I	LV	LT	LU	HU I	MT	NL /	AT F	'L F	т ғ	80 9	51 9	5K I	= 9	SE U	ĸ
Merchanting	0.9	0.0	0.1	1.4	0.5	1.2	2.2	0.0		0.6		0.1	2.0	0.4	0.2	6.7	0.9	0.5	1.0	0.9	0.0	0.2	0.0	0.5	0.0	0.3	1.7	
BoPG1_FTS	-4.7	2.4	-3.1	-0.9	-0.2	5.0	13.0	1.4		0.5	0.3	0.8	2.4	3.6	1.6	-0.7	-1.3	6.5	1.2	0.7	0.6	3.6	4.1	-0.2	2.0	0.1	0.6	
LawyerPrev	2.1	-0.1	1.5	2.3	2.6	1.4	2.6	1.1	1.8	1.8	0.3	1.0	3.7	1.1	1.0	6.6	1.0	2.9	3.7	2.8	0.8	1.8	0.2	1.4	0.8	2.0	2.0	3.0
CorpTaxRev	6.9	7.9	10.7	5.9	6.2	5.0	9.6	6.0	8.0	5.8	6.3	5.8	17.7	6.1	5.9	13.2	4.8	17.2	7.6	5.3	6.2	8.5	8.5	5.2	9.7	6.2	6.7	8.3
DI_Share	39.2	7.2	15.7	25.9	21.1	27.9	19.0	11.9	31.3	21.0	12.3	20.0	73.2	6.1	12.8	37.3	55.8	36.7	59.7	25.6	23.9	20.8	5.4	17.2	17.5	27.0	36.2	16.5
EATR	26.5	9.6	17.9	22.2	29.9	16.6	14.3	24.4	32.8	35.0	16.3	26.6	12.1	13.8	13.8	25.2	17.8	31.1	23.2	23.0	17.4	25.2	14.8	18.1	17.9	22.3	22.0	25.4
RE_Bal	-0.6	-0.8	-1.5	0.6	0.8	-4.0	-7.2	0.4	0.4	0.4	-0.9	0.2	1.5	-0.5	-0.8	-3.6	-1.4	-9.0	-5.0	0.3	-1.4	-0.1	-0.1	-0.4	-0.8	0.3	1.2	0.9
ForeignTurnover	808.2	127.3	206.9	338.5	435.1	136.7	912.7	261.5	334.9	403.9	161.4	433.4	244.5	164.7	172.8	673.3	216.0	205.0	561.3	407.4	175.2	202.2	113.7	220.9	218.1	338.0	362.5	398.3
Fin_trade_flow	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.0	0.1	0.1	0.1	0.1	2.4	0.0	0.0	3.2	0.2	0.7	0.5	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.2

Table 1: Overview of selected markers by outliers

Note: Cell is highlighted in red if long-term average is larger (resp. smaller for EATR and RE_Bal) than (median+st.dev) of EU sample.

3. Methodology and results

We start by performing regressions in order to get a first overview of potential markers affecting the investment income balance. Table 2 shows the coefficients of six estimation methods, being (1) pooled OLS for all EU countries, (2) country fixed effects OLS for all EU countries, (3) pooled OLS for the 22 non-ATP countries (excluding NL, IE, LU, CY, MT and HU), (4) country fixed effects OLS for the 22 non-ATP countries, (5) Bayesian Model Averaging (BMA) for all EU countries and (6) BMA for the 22 non-ATP countries. The direct investment share in total assets, the corporate income tax revenue share, the lawyer prevalence indicator, the gross value added of the legal sector and the reinvested earnings balance seem to show up as relevant indicators in most methods. Furthermore, the inclusion of the six countries vulnerable to ATP matters strongly for the results. In terms of both magnitude, significance and sign, omitting the ATP countries group affects the relationship between the markers and the income balance substantially.

Dependent: IB						
	pooled 28	fixed effects 28	pooled 22	fixed effects 22	BMA 28	BMA22
	(1)	(2)	(3)	(4)	(5)	(6)
(Intercept)	4.61		-4.87 ***		4.30 (1.00)	-5.03 (1.00)
niip	0.03 ***	-0.01 **	0.02 ***	0.04 ***	0.03 (1.00)	0.02 (1.00)
cafit	0.27 ***	0.15	0.09 ***	0.00	0.24 (0.98)	0.05 (0.57)
l.tax	-5.05 **	-1.47	-0.07	4.58 ***	-3.32 (0.70)	0.15 (0.22)
log.gross_position.	-0.66	-0.61	126 ***	-0.84 **	-0.39 (0.62)	1.21 (1.00)
l.foreign_gva	-2.00 ***	-0.62	-0.08	-0.66	-1.98 (1.00)	-0.03 (0.17)
I.DI_share	0.07	-1.84 **	-0.21 *	-0.36	0.07 (0.39)	-0.12 (0.37)
GIFTS	0.24 ***	0.04	0.13 **	0.01	0.23 (1.00)	0.14 (0.99)
I.merchanting	0.24 ***	0.10 **	0.04	0.02	0.17 (0.73)	0.00 (0.14)
I.EATR	5.09 **	5.73 **	2.62 ***	-0.40	3.36 (0.70)	221 (0.91)
I.OT_TOT	0.13	-0.15	-1.64 ***	-1.37 **	0.01 (0.36)	-1.73 (1.00)
lawyers	-0.61 ***	-1.41 ***	-0.51 ***	-0.05	-0.51 (0.83)	-0.32 (0.70)
I.legalGVA	1.33 **	-0.97 **	-0.47 **	0.56 *	1.13 (0.85)	-0.18 (0.30)
RE_bal	0.45 ***	0.40 ***	0.81 ***	0.76 ***	0.46 (1.00)	0.85 (1.00)
sh_deb	0.55 ***	0.40 ***	** 66.0	0.48	0.53 (1.00)	0.73 (0.89)
l.fin2tradflow	0.45 ***	0.22 *	0.06	0.10 **	0.31 (0.74)	0.01 (0.15)
R2	0.85	0.59	0.93	0.75	0.85	0.93
Adj. R2	0.84	0.48	0.92	86.0	0.84	0.92
No. Clos.	194	194	154	154	194	154
Ind. 6 ATP	YES	YES	NO	NO	NO	YES
Fixed eff.	NO	YES	NO	YES	NO	NO

Table 2: Estimation results based on (fixed-effects) OLS and Bayesian Model Averaging, with the investment income balances as the dependent variable

Note: OLS significance denotes Driscoll and Kraay standard errors. BMA based on full enumeration of alternatives, using a hyper-g prior and a Ley and Steel (2008) random model prior.

We proceed to choose the most relevant markers by BMA based on the 22 non-ATP countries (column 6 in Table 2). Figure 3 shows the variables which provide the best fit to determine the investment income balance based on the 500 model variants with the most explanatory power. This agnostic approach determines which variables would ideally be included in the model to explain the investment income balance. Apparently, variables such as the NIIP, the retained earnings balance, the G1-FTS difference and the effective average tax rate show up as having the most explanatory power for the investment income balance bases on these 500 model variants.

Figure 3: Variables to be included in investment income balance regression based on BMA using 500 model variants with most explanatory power



Note: BMA based on full enumeration of alternatives, using a hyper-g prior and a Ley and Steel (2008) random model prior.

The six identified ATP countries are vastly different from the 22 non-ATP countries. Figure 4 shows the observed and predicted (based on BMA for 22 non-ATP countries) income balance. While the income balance of the 22 non-ATP countries (grey) have a well-predicted income balance, the six countries exposed to ATP (blue) display huge difference between predicted and actual income balances. The difference is very pronounced in the cases of Luxembourg and Ireland, the countries with the largest average income deficit (see above). Interestingly, we find a correlation between the absolute value of the current account residual based on Coutinho et al (2018) and the absolute value of the income balance residual (Figure 4b). As such, there is a link between the unexplained components of the investment income balance and the current account balance. The unexplained parts are the largest for the six ATP countries.







Figure 4b: Absolute values of the income balance residual and current account residual

Next, we introduce Principal Component analysis (PCA) in order to find common trends within the group of markers. Especially for countries exposed to ATP, finding common components between markers can give rise to an "ATP score". We find evidence that components might be intertwined, for example between the merchanting balance and the BoP G1-FTS difference (Figure 5). Taking this example, this would mean that a higher merchanting balance coincides with a bigger difference between the G1 and FTS merchandise trade balance (as a proxy for the globalization of the current account).

Figure 5: Merchanting balance and BoP G1-FTS difference







Figure 6: Principal Component Analysis of non-ATP countries, first and second eigenvector

This allows us to create a "dissimilarity score", i.e. ATP score, to pinpoint which countries are most dissimilar with respect to the first principal component based on the restricted non-ATP sample and the full set of markers (blue bars in Figure 7). The ATP score or dissimilarity score measures the Euclidean distance between the observations for each country with respect to the first principal component. Ireland stands out as being the most dissimilar, while the other five countries vulnerable to ATP (LU, NL, HU, CY and MT) also have a relatively higher score. Interestingly, the dissimilarity score correlates with a score based on the absolute income balance residual (yellow bars in Figure 7), i.e. the unexplained component of the income balance based on the BMA for the sample of 22 non-ATP countries. Note that the income balance residual can be read in % of GDP.



Figure 7: "Dissimilarity score" and score based on the income balance residual

We view the dissimilarity score as a proxy for ATP incidence, i.e. a large score correlates with a higher possibility of having characteristics of a country whose tax rules can be used for, or may facilitate, ATP behaviour. In addition to this, the dissimilarity score might help in explaining the current account balance better and thus aid in external sustainability analysis. This is backed by the positive correlation between (the log of) the dissimilarity score and the current account regression residual based on Coutinho et al (2018) (Figure 8).



Figure 8: Dissimilarity score and current account regression residual

4. Conclusion

We develop a "Dissimilarity score" to gauge ATP incidence of EU countries based on a set of economic, statistical and legal markers. While the investment income deficits of catching up EU economies can be predicted well using these markers, the large income deficit of countries exposed to ATP cannot. We use Principal Component analysis to find common components between the markers and create a dissimilarity index, which we regard as a proxy for ATP incidence or "ATP score". Mostly taxation and legal markers and the direct investment share in foreign assets have similar components. The ATP score differentiates between countries based on the set of markers and correlates with the unexplained part of the income balance. The index indicates Ireland as having the largest ATP incidence, while the other five EU countries vulnerable to ATP also display relatively high values. The developed ATP score correlates with current account regression residuals and may thus help in external sector sustainability analysis.

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Annex with additional figures

Figure 1: Investment income balance and net international investment position



Figure 2: Merchanting balance and current account balance, % of GDP (2017)











Figure 5: Lawyer prevalence



Figure 6: Lawyer prevalence indicator and the investment income balance





Figure 7: Retained earnings balance, % of GDP (average 2005-2018)

Figure 8: Turnover per person employed in foreign-controlled firms, in thousands of euros (2017)





Figure 9: Services trade balance on subcomponents, % of GDP (long-term average)



Figure 10: Ratio of financial flows to real trade flows

Figure 11: Dissimilarity index and score based on investment income balance regression residual





Figure 12: Dissimilarity index and current account regression residual variance