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Foreign direct investments.
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Paper abstract

We have chosen to study the FDI topic as its world table of flows' landscape, together with the role of individual countries as adequate in context in a series of papers of both large(r) and narrow(er) size(s). A distinct theory of FDI (sources) was equally needed – while / despite that other several theories were already existent – and this was drawn together with a corresponding model in two parts that were also called ‚models'. ‚Model one' was aimed to study on data directly offered by UNCTAD – FDI-inflows and/versus DIA-outflows, as a double basis – and focuses on analyses that are seen as [A] static and [B] dynamic views. ‚Model two' prefers the FDI-DIA double basis turn into a unique-basis with a different accounting concept and so/then the two models: (i) found a deeply uneven distribution of FDI&DIA sources together with a general trend of remaking the FDI=DIA flows by individual countries; (ii) also found a reduced number of countries, in the total number of them world-wide, detaining world capital majorities on both FDI&DIA, plus a cumulated deficit (FDI< DIA) that actually makes the FDI activity popular for a larger number of countries, at the same; (iii) helped the description of the FDI&DIA picture world-wide by world regions and countries, in which (iv) the regions reached a general classification, as FDI&DIA behavioural and (v) sections of the international capital were found on the world territory encompassing individual countries and regions, and so, finally, (vi) our research tried to get at least to the major FDI&DIA flows world-wide during a quarter a century representative epoch like the 1990-2015 interval is. All remaining to complete such a study on those data is the second part of model one, the FDI&DIA dynamic view – i.e. while all the previous results and findings see the whole interval done, the dynamic analysis will be the lonely one viewing it also by parts. It is what will be developed in/by the paper below.

Keywords: *foreign direct investments (FDI), direct investments abroad (DIA), international direct investing, investment flows & stocks, world multi-country regions, capital market & sections.*

JEL Classification: *E22, F21*

1. Introduction -- the model

WIR 2016[2] offers a double data table for the foreign direct investments (FDI) and direct investments abroad (DIA) of each of the 215 UNCTAD member& reporting countries(i) in each of the years of the 1990-2015 interval. Basically, all the numbers/amounts written down there do result from FDI&DIA transactions between individual countries(i) of amounts noted as m (and of course, cumulated):

m (Y) = m(X)

which means that country X invests (i.e. DIA) in the (FDI recipient) country Y the m traded amount – i.e. the whole model development will keep entries/ inflows on the left hand-side and issues /outflows on the right hand-side. The model keeps its assumptions as in Figure 1.

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[2] UNCTAD: *World Investments Report 2016*

Figure 1

The model assumptions[3]:

/1/ These amounts of capital are never invested in the same country, but compulsorily in another one[4];

/2/And they might be what is popularly called international investment (foreign direct investment) transactions -- but also basically what is called an investments *flow:* FDI inflow and /or DIA outflow – the two latest, as seen by the countries involved in such transactions – see the volume of such transactions done during up to one year time;

/3/ A single transaction, a one-year flow and all that comes to be more than these, as amounts traded – which here are supposed to start from amounts like 'm' -- will be in two postures, i.e. on both sides of the equality sign. And this gets enough important for the modelling practice.

/4/ Hence, each transaction recalls and respects the basic accounting rule -- e.g. between debit (left hand side of the equality) and credit (the right-hand sign of the equality).

/5/ All model equalities let the same inflow on the left and outflows on the right-hand sides.

/6/ And, according to /3/ above – i.e. despite the two appearances of the 'm' basic amount --, this is just one flow to talk about that moves between at least two countries.

/7/ Each individual transaction and all transactions cumulated leave the basic amount equality between investments made by investor countries (DIA) and those received (FDI) by the recipient countries[5].

/8/ And reciprocally, each investment amount or part of amount found throughout data exposed by '*WIR 2016'* is supposed to be investment both made by a country and received by another country;

/9/ There might also be one investor country for several recipient countries, and conversely -- as much as (at the world level, once more) the FDI=DIA equality sees itself valid since each individual transaction, as already seen above, passes through world flows of each year and get to FDI/DIA stocks as such (flows cumulated of all multi-year periods). Recall that *'WIR 2016'* offers FDI&DIA flow data on all years of the 1990-2015 interval.

/10/Besides, whilst the FDI=DIA equality for the world area extends its validity to all time terms, for world FDI&DIA sections this equality becomes approximate and its validity restrains its truth to capital stocks of an interval period or another, either.

/11/ International investments start between neighbouring countries – i.e. member countries of a region. These primary and intra-region investments are likely lower amounts (invested) on the short term.

The model develops on two specific parts. **Part one / model one: the world level** develops, in its turn, on the two basic views. **[a]** The **static view** (Andrei&Andrei 2019) bases on**:**

$$\sum FDI_{ij} = \sum DIA_{ij} \qquad (1)$$

as equivalent to:

[3] See the last and distinct Annex 10 for the model Synopsis regarding our whole series of papers about Foreign Direct Investments.

[4] Despite the oddity that this assumption sentence sounds, it will prove more than important in the following context below.

[5] Or, there might be a problem -- the primary one in all orders -- since our data source here develops a (primary) error-inequality as such. Our solution here used was a re-conversion coefficient between the world levels of FDI and DIA -- this is a double one: 1.015671 for DIA converted into FDI and 0.98457, as the opposite, though giving a relatively low FDI-DIA world difference. Despite using such palliative solution, the problem remains and, in our view, this is the source of most forthcoming errors. See details in Andrei&Andrei (2019, pp. 31-45).

$$\sum FDIstckBal_{ij} = 0 ; \quad i=1...n; j=1...m \qquad (2)$$

in which:

/ i = individual country

/ j = the year (period) considered

/ $FDIstckBal_{ij}$ = balance of international investment stocks (inflows minus outflows) of country i at the the time j (Andrei & Andrei 2019, pp. 291-292).

The static view of model one does **apply** for:

/ finding the same world entities on tops of the FDI and DIA flows – the „concentric circles" appearence of the international capital flows;

/ some description of the world regions (multi-country), as FDI&DIA entities:

/ each country's FDI&DIA short description.

For **[b],** the **dynamic view** of model one the premisses are FDI_{ij} (%) = weight of country i in total world FDI stocks at moment j, the same for DIA_{ij} (%)= weight of the (same) country i in total DIA stocks at moment j. Each of these two makes distinctly: $\sum FDI_{ij} = 100$ (%) and $\sum DIA_{ij} = 100$ (%), then, finally the dynamics D_FDI_{ij} here defined as:

$D\_FDI_{ij} = FDI_{ij1} - FDI_{ij0}$

$D\_DIA_{ij} = DIA_{ij1} - DIA_{ij0}$

make the null sum together with the dynamics of the same periods of all the other countries separately on:

$$\sum D\_FDI_{ij} = 0 \qquad (3a)$$

$$\sum D\_DIA_{ij} = 0 \qquad (3b)$$

Note: As for the model's application, this last dynamic part will come after the one of Part two's/ model two's one, i.e. just in this paper below.

Applications – that will develop below, in this paper – will be**:**

/1/ deepening the FDI&DIA flows' evolving along the (long-term) 1990-2015 interval – no previous such approach so far;

/2/ observing the same evolution of the difference-errors reported, eventually for their sources to be identifyed;

/3/ trends and evolutions concerning *international capital sections* – e.g. between a sectional configuration at the beginning of the interval (1990/ two sections) and the final one at the end (the 2015 year end);

/4/ evolutions of FDI&DIA weights and hierarchies of world entities along the same 1990-2015 interval.

Then, **Part two/ model two[6]: between the double basis and the unique basis** does convert the previous / basic double basis model to a unique basis one and so it requires the introduction of specific items for the (same) individual country i:

[6] *Andrei &Andrei* (2021).

Tv – turnover: total of FDI and DIA of the same country, with the same (+) algebraic sign all over, divided by 2 – i.e. each unit of amount traded as international investment belongs to (at least) two different (investment partners) countries:

$$Tv_i = ½ (FDI_i + DIA_i) \quad (4)$$

On total world, Tv equals both FDI and DIA parts, previously assumed as basically equal:

$$Tv_{world} = FDI_{world} = (-) DIA_{world} \quad (5)$$

Ccp – cooperation capital[7]**:** FDI_i or DIA_i that are lower than the opposite flows, for the individual country i. These are the transactions of a country having their pairs (equal sizes) in the / a partner country – i.e. except for *re-investments.* The model here assumes: all the intra-region FDI&DIA transactions as Ccp, plus their priority in DIA of all countries, but there also are *long-distance Ccp* – i.e. between country investment partners of different regions. *Re-investments* are the amounts of transactions satisfying the Ccp's basic rules, except for pair transactions/ counterparts in other countries – e.g. a country receiving FDI (long-way flows, from big international investors), of which, then, on the short-medium term she partly re-invests within its region: there results on the DIA side a Ccp with no Ccp type correspondence in any other country; the investment recipient countries in such circumstances will record long-way flows, the other (following) status of the international amounts invested.

Lwf – long-way flows[8]**:** the same as the above FDI stocks balance of a country, but with the (+) algebraic sign only. The same Lwf amount equally accounts for the investor and the investment recipient countries – which makes it attributable by its half to each of them in their specific turnovers:

$$Tv_i (= ½ [FDIi + DIAi]) = Ccp_i + ½ Lwf_i \quad (6)$$

In fact, Lwf are DIA (out)flows from international investor countries to entity targets in other regions not assuming the capital amounts' return to the investor – i.e. like in the Ccp case. The higher the Lwf amount traded, the longer its geographical distance made – i.e. no Lwf assumed within the multi-country region, but only off the region, here assuming the long-term analysis. Despite this, the model accepts switching between Ccp and Lwf in diverse circumstances. The **applications** of *model two* **–** i.e. as a reply to the previous **"concentric circles"** image of the international flows and process (Andrei & Andrei 2019, pp. 290-291):
/deepening on types of the regions – i.e. the [a], [b] and [e] types --, as previously described in Part one/ model one;
/ international capital sections identifying FDI&DIA stocks accumulated in the 1990-2015 interval;
/ detecting the most important world-wide FDI&DIA flows.

2. The dynamic approach itself[9]

Once more, we preferred this paper of ours on the *WIR-2016*'s data and on our model with the brief above Introduction and description. An assessment of expectations and limitations of this approach's basics of results is offered in Annex 1 – i.e. also recall the afferent applications noted above, together with equations (3a,b). Concomitantly, the step-back was made from the model two terms – i.e. Ccp, Lwf and Tv -- to the ones of model one – i.e. FDI/inflows I, DIA/outflows and FDIstckBal. So, recall that dynamics on the FDI flow and (separately on) DIA flow result as basically independent from each other, in terms of the model. Or, this might clear the way for observing, on the contrary, the connections between what happened on the DIA flows part and on their opposite FDI flows. Then, see Annex 2 with world entities observed

[7] Andrei& Andrei (2021, pp. 12, 39-41).
[8] Ibidem, pp. 12, 13, 39-41.
[9] Also see *Andrei & Andrei* (2019, pp. 51-58) for some basic details.

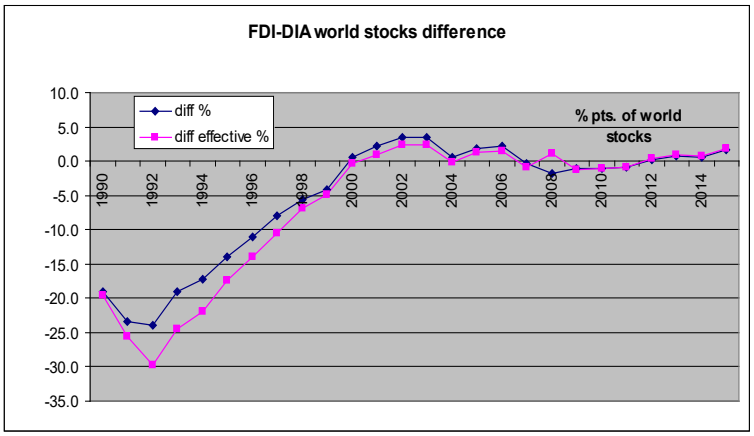
directly by our study, as representative. And then let us have the specific findings of this last approach.

2.1 The data errors recorded

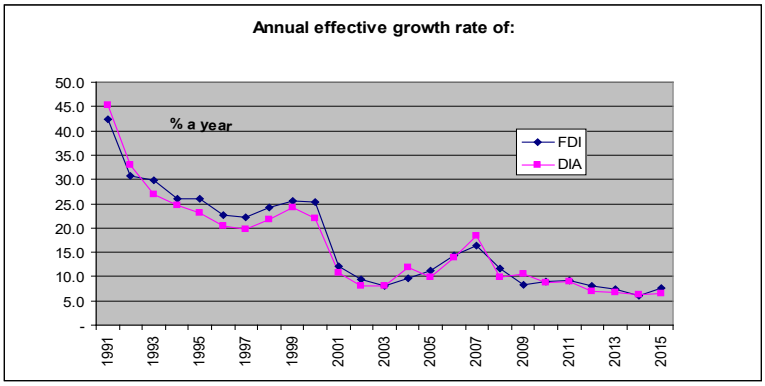
There is first to be reiterated what we wrote in Andrei& Andrei 2019, page 33, about "a truth that cannot be here ethically ignored" on data exposed in WIR-2016, but there will be some more than that, as seen all below. There are two types of *differences-errors* to talk about: the one refers to what is happening to reports on FDI and DIA flows – i.e. between them, see Figures II, (a) and (b) – and the other to differences between totals exposed and those effective, as computed in the detail of regions[10].

Figures II [11]

(a)



(b)



(See *Andrei& Andrei 2019*, pp. 33-35)

We, though, prefer to here avoid trying any deep explanation about such an accounting work of the WIR-2016's side[12], maybe except for here observing how these figures help understanding that only all cumulated capital stocks of the given interval push the errors downwards to about 1.6% -1.7% of world stocks[13] – i.e. working on/ referring to annual flows

[10] For more details, see *Andrei &Andrei* (2019, pp. 31-40).

[11] Percentages in these two graphs reffer to and stop on the FDI&DIA nominal dollar amounts.

[12] In our opinion these errors come from time differences of the same transactions recorded as FDI-inflows of a country and DIA-outflows of another partner country. And this explains both the stock errors' enlargement along the given years interval and, on the contrary, the same errors' lowering nearby the end of the interval.

[13] Andrei & Andrei (2019, page 59/footnote).

or to just pieces of this interval equals taking higher such differences-errors. The very problem here is that such a data situation defies the bases of model one – see its formulae (1), (2) and (3a,b) – all referring to the identity between FDI and DIA amounts world-wide, plus the logically resulted identity between the FDI's dynamics and DIA's dynamics, as both overall and year by year. Then, it also becomes obvious that/how this overall/final 1.6%-1.7% difference-error "spreads" into sensibly higher percentages on different specific periods of the whole 26 years interval[14]. Despite all these, it occurs also that concomitantly the errors on both FDI&DIA flow sides succeed to reduce the overall errors' level here and there.

As for the other zone of errors – i.e. the one between exposed and effectively calculated amounts – this keeps on the mention here made by the *WIR-2016* statistics in the sense of "not including the financial world centres"[15]. Overall, taking the data errors as such[16] come to alter a bit the researcher's attitude against them and against this whole such work – e.g. instead of disqualifying /rejecting this last for such "compromising deficiencies", on the contrary, getting used to approximations and estimation on the capital concept, i.e. see Annex 3.

2.2 The international capital sections evolving

Then, it is to be explained the reason why this same approach has been preferred as coming after and not before the model two approach – i.e. see the next Annex 4, with not only the outline of the world capital structure on its three sections found in our previous approaches of model two (Andrei & Andrei 2021, pp. 24-29; Andrei & Andrei 2023, pp. 28-45), as a world FDI&DIA long-term trend, but also with a similar outline here found of the same world capital-investment on just two sections, as appeared on the flows of 1990. In other words, our next finding – i.e. after the above one about the differences-errors evolving -- in this paper is that the world capital structure on sections appears as more than a long-term trend – i.e. here it is about a true evolution of the world capital-investment between a (newly found) two-sections description in 1990 and the three-sections one in 2015, already found in our other previous approaches (Annex 4).

And what actually happened along the 1990-2015 interval sees the two first-class world investor entities that are the United Kingdom and Japan. The previous leaves Section 1 for Section 2; the latter leaves Section 2 to build up its own new Section 3 restricted to the Pacific area. Both these countries apparently lower their both FDI&DIA capital flows – i.e. it is true that the UK seems even more "confused" in its acting on such a long term, than Japan, who just does it continuously since the first years of the interval.

2.3 The dynamics themselves [17]

Annex 5 sees the 20 world entities' dynamics in ranking on both FDI and DIA flows, besides the afferent errors, between the moments of 1990 and of 2015 – i.e. along the interval in study. There is, in this Annex, just one table in two hypostases separately following the specific A/*direct* and B/*indirect* connections between world entities' capital flows in our model context.

The **A/direct connections** are here assumed to follow the long-term trend from the 1990 capital sections structure to the one decanted through the 2015 year end – i.e. that means working throughout the sections, here including throughout regions, and destructuring the old sections to rebuild the other sections structure, where the case, either. So, this category of connections works between dynamics of the DIA side and and the ones of the opposite FDI side.

[14] E.g. in a way here reminding of the high significance of about just +1 degree-temperature for the global warming.

[15] Shortly, a significant FDI&DIA country like British Virgin Islands (Caribbean) is missing from the FDI&DIA dominant world entities' group mentioned in the below paragraph 3.2. See also *Andrei& Andrei* (2019, pag. 36).

[16] But equally other aspects of this study.

[17] See *Andrei & Andrei* (2019, pp. 30-31) for basics of the model on dynamics.

In such an order, the highest dynamic appears the negative one of Japan (DIA: - 14 percentage points). As seen in Table A/ of this Annex, this DIA (international investments) reduction appears able to do the same with the FDI of Australia, New Zealand, Canada and even the US. Then, the Japanese exit of Section 2 sees itself complete when also its FDI-inflows from New Zealand drop down. However, this Japanese DIA drop looks obviously higher so far – i.e. the US' corresponding shock on FDI might be alleviated by positive evolutions on the DIA from: Caribbean, Canada, Central America, Australia, UK and even Africa, all of these belonging to Section 2 during the whole interval in study.

Secondly, the UK leaving Eurasia might be more obvious for its serious FDI drop together with the ones of the Eurozone's and West Europe's DIA and a little less transparent on the UK's DIA – i.e. that do not actually drop, but move to the US' direction, while the same Eurozone and West Europe obviously appear to loose some good dynamics on their FDI, as well.

This is the context in which the US – i.e. while losing dynamic on their FDI side, as already here above explained – will win the global game on their DIA and directly/ positively entrane in this the FDI-inflows of: Caribbean, Africa and Central America, in the decreasing order and, of course, belonging to Section 2.

The **B/ indirect connections** between world FDI&DIA entities do work on each of the FDI and DIA flows as distinctly and result from the specific null sums requirement of equations (3a,b)– i.e. starting from the ones with FDI drops (UK, US and the following on the bottom-up sense of the FDI column in Table B/), then on the other with DIA drops (in which, besides Japan, there are just Eurozone, West Europe and New Zealand) this will result into clearing the way for other entities' success to compensate such drops on both FDI&DIA flow senses. Or, the US was just mentioned above for its indirect advance on DIA – besides, East Asia, Caribbean, CIS countries and South America advance on both FDI&DIA and come to top dynamics of these. In such an order, another group of entities does follow them and equally on both flows: Near East, Central and Eastern Europe, Central America, Africa, as the whole, and South Asia. Oceania and, partly, South-East Europe stay along the whole interval about the „zero-dynamics" of both flows, US, UK and besides them South-East Asia, Australia and Canada contradictorily evolve on FDI and DIA and finally Japan, the Eurozone, West Europe and New Zealand do obviously "lose" dynamics on the same opposite flows of international capital-invested.

Since the direct connections attached to model two and indirect connections to model one, these two categories also contradictorily evolve – i.e. the indirect connections, basing on the null sum principle of equations (3), make both the international investments' drops more abrupt and their positive replies higher than experienced in fact. And let us here consider the most significant examples with the same type of contraction. The first one comes on the Eurozone – i.e. its DIA's drop -- face to about most of Eurasia – i.e. East Asia, Near East, CIS countries, Central and Eastern Europe and a little bit the South-East Europe – positively evolving on both FDI&DIA. The other example comes on Japan – i.e. its largest DIA's drop world-wide – face to South America – i.e. in its obvious promotion on FDI at the same world scale. Or, the next following Annex 6 makes it clear, by the year-by-year evolving in absolute US$ amounts invested, how much both the Eurozone and Japan do reconcile each their investments with their partners in the sectional dynamic context of the international capital -- i.e. and the dynamic that it is here about, this time, not any more that specific to our model, but the basic one, directly evaluated in dollar-amounts. Annex 6 actually finds Section 2 as with the highest intra-section correlation between the US' DIA and the FDI received by the rest of the area and conversely, the US' FDI-inflows with DIA from world investment partners.

A problem of such FDI-DIA correlation might be seen in the same Annex 6 for the narrower Section 3 – i.e. it is about the Japanese FDI-inflows that look rather restricted since 2005-2006, while the South America's DIA actually do continue their growth, probably on the intra-region's cooperation capital (Ccp), as previously found in Andrei & Andrei (2021, pp. 12,

39) and Andrei & Andrei (2023, pp. 38-39). Here recall that in this narrower and more recently formed Section 3 Japan isn't that major investor, as in the cases of the other Sections 1 and 2 – i.e. the Japan's DIA do not cover the rest of Section 3's FDI, despite the huge difference of investments' sizes between Japan and any other country in this area of Pacific (ibidem, pp. 28-31).

2.4 World entities' FDI's and DIA's specific dynamics and statics[18] along the 1990-2015 interval

This paragraph is for the next Annex 7, in which the same 20 world entities rank, by their FDI&DIA stocks, in 5 different moments of the interval in our study. This is a view different than the one of the previous Annex 6 on the international capital's dynamics' influence on the static description of the same capital. In the decreasing order of the two flows' specific rankings, first, the Eurozone and US rather see themselves not affected in their top FDI&DIA positions, in about all these moments, by any negative (the Eurozone, on both FDI&DIA, the US, on FDI only) or positive (the US, on DIA) dynamics, here recalling our expression of "black-hole" type (Andrei & Andrei 2019, page 290). The UK, in its contradictory dynamic context, gets the 4th position on both FDI&DIA stocks in 2015, in a not too large downward movement on the FDI side and similarly an upward one on the DIA side. The Japan's story looks different, since keeping the 2nd position world-wide in 1990 – i.e. just after the Eurozone -- on DIA and the 12th one on FDI – i.e. its drops on both flows are important: to the 6th one on DIA and down to the 16th one on FDI. West Europe and South-East Asia meet similar ups and downs: the previous between the 5th and the 7th positions on FDI and between the 4th and the 5th positions on DIA; the latter between the 4th and the 7th positions on FDI and rather maintaining between the 8th and the 9th positions on DIA. The previous (West Europe) stays different than the latter (South-East Asia) as respectively a net investor region, versus a net investment recipient one.

The most obvious and positive influences of dynamics seem to be met by East Asia and South America, on the FDI side and both with their indirect dynamic connections, as found in the above paragraph – i.e. East Asia from the 6th to the 3rd positions and South America from the 9th to the 4th positions. On the DIA side the East Asia performs exactly the same, while South America rather maintains between the 10th and the 11th positions. However, Caribbean seems to succeed even better by its dynamics on both FDI&DIA, except for not reaching the world tops of them – i.e. from the 16th to the 8th positions on FDI and from just the last 20th to the 7th positions on DIA. Similarly, the larger CIS region jumps to the 10th positions from the last 20th one on FDI and from the 18th one on DIA. Central and Eastern Europe does advance with ups and downs between the 15th and the 12th positions on FDI and between the same 15th and the 13th positions on DIA. The Near East also positively evolves from the 15th to the 11th positions on FDI and from the 19th to the 12th positions on DIA.

Canada does maintain between the 8th and the 9th positions on FDI and, rather similarly, between the 7th and the 8th positions on DIA. Not quite close to Canada's positions in the FDI&DIA world ranking, but in similar circumstances of ups and downs between the top investment entities and those promoting on international capital, on the one hand, and the below coming ones with downward moving positions in their world ranking, on the other, there are to be found South Asia and South-East Europe.

Finally, the group of entities downward evolving on both FDI&DIA world-wide comes to be formed by: Japan, New Zealand, Oceania and, partly, Australia – i.e. this last does it more obviously on FDI, while it stays a net FDI-recipient country, than on DIA, for which the Australian downward evolving on the world ranking seems to limit to the 2010-2015 last part of the interval.

2.5 The world countries in their regional context

[18] See also Andrei & Andrei (2019, pp. 29-31) for basics of the model.

The above developed study on the 20 world representative entities' FDI&DIA was all over here preferred for its consistency – e.g. the connections of the FDI&DIA's dynamics reached with model two through its FDI&DIA's structure on regions and sections and through the world investment flows identified -- and its transparency and intelligibility in the text – i.e. for the model's explaining and expression. However, our study isn't supposed to end here – i.e. beyond such methodological qualities of the study lies the basic principle of our theory and model that individual countries – i.e. and not the regions -- are and remain the subjects of international capital transactions. As for the countries' FDI's and DIA's dynamics – i.e. in which positive and negative corresponding numbers for individual countries bring in something similar to the positive and negative FDI stock balances of the same individual countries resulting in the other static analysis – i.e. the analysis on regions (which are the "over-entities") -- might be able, where the case, to offset significant FDI&DIA behaviours of individual countries within – e.g. there are not assumed as the same a region in which all countries expose a common positive dynamic level and another region totalizing the same positive dynamic's level, but in which one, two or three countries do evolve with negative dynamics. Also recall Annex 2, with its 20 regions' classification, together with Andrei& Andrei (2021, pp. 5-10)– i.e. regions of [a], [b] and [e] types, the same for the above 2.3 paragraph, in which the dynamics are assumed to connect between the investors' and the investment recipients' sides as directly. A region that is also assumed to keep more or less economically integrated, here including for its more or less homogenous international capital behaviour, equally keeps its priority as influential on its individual countries' specific behaviours – i.e. on the contrary, there might be also other off-the region influences on the FDI&DIA behaviour of the individual country and this will be made visible by the intra-region discrepancies of individual dynamics.

Annex 8 so here comes as illustrative on this aspect and there also remains to comment on it. First, this Annex of just one comprehensive table comes to compare to Annex 5, as also to its previous Annex 4 – i.e. in which the dynamics were attributed to the regions and to the (three) sections' design of the international capital flows.

2.5.1 Methodology-added

In Annex 8, as in the tables of Annex 4, the three capital sections are ranged in their decreasing order of capital amounts working. The same for regions and big net investor & investment recipient countries off the regions; the same for countries mentioned as inside the regions; the same for each of the flows' senses as FDI-inflows and DIA-outflows.

Apparently / formally, the 20 main FDI&DIA world entities (especially regions) here remain priory – i.e. they are numbered as such in the table. In reality, this table-Annex 8 does operate the essential change according to the here above reiterated basic principle of individual country – i.e. and not the region that it belongs to – makes the international capital transactions. Or, this is the way Annex 8 operates to paradigm change, e.g.:
/ the [a] type regions will adjust their total dynamic numbers to the ones of dominant countries,
/ while the [e] type regions with no FDI&DIA dominant countries will keep their dynamic previously noted in Annex 5 – i.e. except for the whole Africa[19] and Oceania, of the [e] type regions here reconsidered by their significant FDI&DIA distinctly observed in large regions.
/ The [b] type regions -- but also some [a] type regions, where the case -- will distinctly take into account the dynamic disparities of individual countries – i.e. the dominant ones, as according to Andrei& Andrei (2021, pp 5-9) – through distinctly writing them down – i.e. once more, in this methodology-added cumulating a positive dynamic of a country with a negative dynamic of another country isn't the same with the two dynamics distinctly considered, due to differences in direct connections / influences within the section and world areas of distinct individual dynamics.

[19] In which continent with the highest number of countries a rather restricted number of these benefits for significant FDI's and DIA's dynamics, as in the quick view of Annex 9.

/ The same as in Annexes 4 and 5, in Annex 8 the intra-section FDI&DIA flows are basically considered, together with the two extra-movements made by the UK – i.e. between Sections 1 and 2 -- and Japan – i.e. between Sections 2 and 3. This is why here the UK remains considered in both Section 1 – i.e. by its negative evolving on the FDI-inflows side, presumably related to evolutions within the Eurozone and West Europe (negative at the same) and on the opposite DIA side -- and Section 2 – i.e. by its opposite DIA-outflows side, where the UK slightly positively evolves through moving its amounts to the US destination. Differently than the UK, Japan leaves Section 2 by lowering both its DIA-outflows to New Zealand, Australia, Canada and US – i.e. FDI-inflows of these – and its FDI-inflows from the New Zealand – i.e. its DIA. / The UK is noted, in Annex 8 – i.e. as differently than in Annex 4 --, still in Section 1 for its FDI (negative) dynamics and in Section 2 for its positive ones; Japan remains considered for similar reasons in Section 2, with its dynamics on both FDI and DIA sides, and our afferent accounting procedures here related to UK and Japan keep on the inter-connections of dynamics within a capital section or another.

2.5.2 Results renewed

/1/ First, in the decreasing order of significance, the Table of Annex 8 succeeds to ***reduce both FDI and DIA dynamics' differences-errors on cumulating at the world level*** – i.e. from 6.3 percentage points on FDI and 4.7 percentage points on DIA in Annex 5 to, respectively, 1.6 on FDI and 3.2 on DIA, all against 0.0 PP on both the FDI's and DIA's dynamics – i.e. as assumed by model one – and 3.9 PP on FDI and 3.3 PP on DIA previously recorded in 1990, the first/basic year of the interval. Or, it is now crystal-clear that working, as above, with our model on over-entities (regions) would be the essential cause of higher errors-differences obtained, due at least to presumably inevitable redundancies here afferent to dynamics of FDI&DIA. On the other hand, ***this finding proves imperfect,*** as here obtained by our model – e.g. instead of making null sum-dynamic approach on both FDI and DIA. Our result seems to be on the point of lowering the difference-errors on the two flow senses while keeping or even making higher the other differences-errors, those between effective FDI's and DIA's dynamics and/ or conversely.

/ 2/ Second, let us have ***a horizontal / along the lines look on this table.*** In Eurasia / Section 1 – i.e. the FDI&DIA largest and most complex section – the positive and negative dynamics were detached from each-other for a clearer view on corresponding results. Then, in detail the two [b-mix] regions that are the Eurozone and West Europe prove once more their primary importance. In the Eurozone, Germany and Spain do show an interesting correspondence: the Spain's DIA dynamic's rise together with Germany's FDI dynamic and on similar positive amounts; the same for the Germany's lowering dynamic on DIA, similar to the Spain's lowering FDI's dynamic. Then, the group of Belgium, Luxembourg and Ireland meat similarly positive dynamics of FDI and DIA and then the one of Austria and Cyprus meat similar lower, but also positive dynamics of the two flows. Netherlands and Italy meat middle level negative dynamics on FDI&DIA flows. Actually, all the Eurozone member countries meet the same positive or negative dynamics on the two flow senses concomitantly, except for Greece and Portugal, that slightly lower their FDI's dynamics and rise their DIA's dynamics on similar percentage point levels, plus Finland, conversely, with positive dynamic on FDI and negative dynamic on the DIA flows. Last, but not least, the situation of France is the (unique) one with the highest negative dynamics on both flow senses and this double situation does separate France from all the other member country cases in both the Eurozone and the whole Eurasia – i.e. and so the country's correspondence with the UK's behaviour on FDI&DIA remains obvious and this strengthens the corresponding conclusion in the above Annex 5.

Then, for West Europe, as similarly to Eurozone, here at a little narrower scale, Sweden and Denmark expose positive dynamics on FDI&DIA flows and Norway and Switzerland decreasing dynamics on both, as in a visible intra-rupture of dynamics, plus these two latest's negative dynamics on DIA look as important as the France's one in correspondence with the UK's leaving Section 1 behaviour – i.e. once again, Annex 5 said the same, in its turn. The rest of

regions in Eurasia meet positive dynamics on FDI-inflows in block, except for Thailand (-0.6 percentage points /in South-East Asia) and Taiwan (- 0.2 percentage points /in East Asia). Or, these two last country cases with negative dynamics – i.e. surrounded by positive dynamics at least in the whole Asia, including the large northern CIS countries' group and the Near East – might accuse either the intra-region flows, as cooperation capital (Andrei & Andrei 2021, page 12), or, once again, a possible direct connection with the UK's FDI&DIA type behaviour. In a word, Annex 8 tends to enlarge the direct connections' set of the UK leaving Section 1 – i.e. it remains certain that Eurozone and West Europe are here involved, but here there equally might come to attach countries from other regions.

/3/ ***For Section 2*** in Annex 8 rather no new conclusions, as compared to the ones of Annex 5 -- i.e. Japan lowers its DIA dynamics, in direct connection with FDI of the US, Australia, New Zealand and Canada, the same as its FDI dynamics, visibly connected to the New Zealand's DIA; the US remain with an important deficit of their FDI's dynamic, despite investments / DIA flows from UK, Canada, Central America (Mexico), Caribbean (British Virgin Islands and Cayman Islands), Australia and even Africa. On the other hand, the US benefit from the highest positive DIA dynamic in the area, here entraining at least the FDI of: Central America, Caribbean and Africa.

/4/ What Annex 8 brings new in ***for Section 3*** is – i.e. besides the privileged position of South America --, its different levels of the countries' dynamics on both flows, plus that Brazil comes on top of the FDI's dynamics, while Chile does the same on the DIA flows. Also, differently than in the Eurasian regions, here might be in such a context that Argentina meets even a negative dynamic on its FDI. Only Venezuela, in the line of top-dominant countries on FDI&DIA, sees its flows lowering dynamics on both senses. Such an intra-rupture of dynamics might be related to the Japanese DIA's dynamic as well as the entities of the above Section 2.

References

Andrei, Dalina & Liviu C (2019): *Foreign Direct Investments. A world scale picture of international capital investing flows during the 1990–2015-year interval.* LAP Lambert. 2019

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Andrei, Liviu C & Dalina (2023): *Investițiile străine directe (ISD). Detectarea fluxurilor ISD la nivel mondial ∗ Foreign direct investments. Flows detected world-wide.* Editura Pro-Universitaria. Bucharest

UNCTAD (2016): *World Investment Report (WIR) 2016*

Annex 1 Assessing the FDI&DIA flows' dynamics approach word-wide

Aiming and strengths	**Weaknesses and limitations**
I. This is the lonely available approach to analyse the course of FDI&DIA along the 1990-2015 interval – i.e. our previous approaching papers were for the whole interval done and all data exposed.	**I.** All data collected on the 1990-2015 interval FDI&DIA stocks come to be related to the 1990 flows -- i.e. and not conversely; and the latest stay as less representative as any annual flows compared to cumulated stocks of the whole interval.
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II. This approach will be able to reveal at least: (1) individual entities' FDI & DIA positions in such a world level classification along the same time interval; (2) possible modifications on international capital sections in such a context.	**II.**Two types of errors/differences are reported as higher during the given interval than in its end: (1) the FDI, versus DIA one and (2) the total world amount reported, versus the one cumulated by entities. **Remark:** Both (all) categories of errors might result just from delaying the same transaction to be recorded by both investment parts in the same time -- and this might be equally able to explain how these errors lower towards the end of the period in study.
----------	----------
III. The afferent part of the model (equations 3a,b, i.e. by their null sums) sees each year amount and, by consequent, each part of stocks that relates to year intervals considered, here including the total interval -- i.e. dynamics of individual entities' FDI and DIA make each the null sum of flows.	**III.**Failures to report data: A/ on individual years (capital flows) and year intervals (pieces of capital stocks) against the model equation: (1) differences of dynamics between FDI and DIA; (2) maintaining and increasing differences/ errors; (3) deteriorating the capital sections' verifying scheme. B/ back to model one's references and so leaving the model two's ones means stop distinctly considering long-way flows(Lwf) and cooperation capital (Ccp).
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IV. The dynamics' direct connections assumed to be between: (1) FDI and DIA of the same individual region -- i.e. this does not apply for individual country-entities; (2) FDI and DIA of (a) different entities within the same capital section (b) according to the sections' evolving	**IV.** The dynamics' DIA connections: occur between entities only on the FDI-inflows side, or on the DIA side -- for example, a large decrease on the FDI amounts of a nation will correspondingly decrease its FDI dynamics, but concomitantly and correspondingly, it may increase the FDI dynamics of other nations without actual increases in their FDI amounts. It is what happens under the null-sum condition of the FDI&DIA dynamics of the individual entities, and it remains equally true on the opposite DIA side. **Remark:** these dynamic's indirect connections seem to alter its direct ones in the numbers exposed by the latter.

Annex 2

World FDI&DIA entities

A	Multi-country region(s)	continent	region type*	dominant
1	Euro-zone	Eurasia	b/mix	(...)**
2	West Europe	Eurasia	b/mix/1	Switzerland
3	C& E Europe	Eurasia	e	(...)**
4	SE Europe	Eurasia	e	(...)**
5	CIS countries	Eurasia	a/1	Russian Fed
6	Near East	Eurasia	a/several	(...)**
7	East Asia	Eurasia	a/several	(...)**
8	SE Asia	Eurasia	a/several	(...)**
9	South Asia	Eurasia	a/1	India
10	North Africa***	Africa	e	(...)**
11	Middle Africa***	Africa	e	(...)**
12	Southern Africa***	Africa	a/several	(...)**
13	South America	Latin America	a/several	(...)**
14	Central America	Latin America	a/1	Mexico
15	Caribbean	archipelago	a/1	Bri Virg. Isl.
16	Oceania	archipelago	e	(...)**

*See details in *Andrei & Andrei* (2021, pp. 5-9) on the types of regions.
** Several FDI&DIA dominant countries / a restricted group of countries.
*** Africa will appear like an individual region in this approach.

B	Country off regions	status
17	United States (US)	net investor
18	Canada	net investor
19	United Kingdom (UK)	net investor
20	Japan	net investor
21	Australia	net recipient
22	New Zealand	net recipient

Annex 3

Differences/errors*
and their dynamics along the 1990-2015 interval on the world level:

[A] Between estimate and effective, on:

[1] Foreign direct investments (FDI)

Year**	estimate		effective		difference- errors		dynamic
	million US$***	% of world	million US$***	% of world	million US$***	% of world	1990-... (%)
1990	204914	100.0	196964	96.1	-7949	-3.9	x
1994	998393	100.0	954404	95.7	-43989	-4.3	-0.4
2000	5336164	100.0	5094005	95.5	-242160	-4.5	-0.6
2010	16171077	100.0	16514521	102.1	343444	2.1	6.0
2015	23715170	100.0	24257517	102.3	542347	2.3	6.2

[2] Direct investments abroad (DIA)

Year**	estimate		effective		difference- errors		dynamic
	million US$***	% of world	million US$***	% of world	million US$***	% of world	1990-... (%)
1990	243882	100.0	235801	96.7	-8081	-3.3	x
1994	1168238	100.0	1142813	97.8	-25425	-2.2	1.1
2000	5303795	100.0	6291898	118.6	988102	18.6	21.9
2010	16341057	100.0	16680634	102.1	339578	2.1	5.4
2015	23310847	100.0	23621870	101.3	311024	1.3	4.6

[B] Between FDI and DIA recorded:

Year**	FDI-DIA		
	% of world	million US$***	% of world
1990	-19.0	-38968	-16.0
1994	-17.0	-169845	-14.5
2000	0.6	32369	0.6
2010	-1.1	-169980	-1.0
2015	1.7	404323	1.7

_____

* The two categories of differences/errors are supposed to be cumulated at the world level.
**The year 1990 is for the specific flows of this year; the rest of years here considered are for stocks accumulated during the previous years following the year mentioned in the interval.
*** Accounted in/for the same year – no depreciation considered.

Data source: our calculations on the *WIR-2016* data.

Annex 4

World capital sections and their dynamics along the 1990-2015 interval

1990*

		FDI		DIA			
Ord.		**Million US$****	**% of world**	**Million US$****	**% of world**		**Ord.**
	Section 1	**Around Eurasia**				**Section 1**	
i	Euro-zone	53232	26.0	91653	37.6	Euro-zone	i
ii	United Kingdom	30461	14.9	24999	10.3	West Europe	ii
iii	South-East Asia	12821	6.3	17948	7.4	United Kingdom	iii
iv	West Europe	10192	5.0	9654	4.0	East Asia	iv
v	East Asia	9143	4.5	2328	1.0	South-East Asia	v
vi	Near East	934	0.5	65	0.0	South Asia	vi
vii	C&E Europe	815	0.4	21	0.0	C&E Europe	vii
viii	South Asia	213	0.1	0	0.0	S-E Europe	viii
ix	S-E Europe	67	0.0	0	0.0	CIS	ix
x	CIS	4	0.0	-711	-0.3	Near East	x
	Section 1	**117881**	**57.5**	**145958**	**59.8**	**Section 1**	
	Section 2	**On Atlantic and Pacific**				**Section 2**	
i	United States	48422	23.6	50775	20.8	Japan	i
ii	Australia	7904	3.9	30982	12.7	United States	ii
iii	Canada	7582	3.7	5237	2.1	Canada	iii
iv	South America	5044	2.5	2363	1.0	New Zealand	iv
v	Central America	3056	1.5	1112	0.5	South America	v
vi	Africa	2845	1.4	658	0.3	Africa	vi
vii	Japan	1806	0.9	226	0.1	Central America	vii
viii	New Zealand	1685	0.8	194	0.1	Australia	viii
ix	Caribbean	437	0.2	14	0.0	Oceania	ix
x	Oceania	302	0.1	-1718	-0.7	Caribbean	x
	Section 2	**79084**	**38.6**	**89843**	**36.8**	**Section 2**	
	World					**World**	
	effective(S1+S2)	**196964**	**96.1**	**235801**	**96.7**	**effective(S1+S2)**	
	estimated	**204914**	**100.0**	**243882**	**100.0**	**estimated**	
	differ-errors	**-7949**	**-3.9**	**-8081**	**-3.3**	**differ-errors**	

*Flows of the year.

**Accounted in/for the same year – no money depreciation considered.

Data source: our calculations on the *WIR-2016* data.

2015 *

		FDI		DIA			
Ord.		**Million US$****	**% of world**	**Million US$****	**% of world**		**Ord.**
	Section 1		**Eurasia**			**Section 1**	
i	Euro-zone	5068342	21.4	7240413	31.1	Euro-zone	i
ii	East Asia	3094472	13.0	2376961	10.2	East Asia	ii
iii	South-East Asia	1349918	5.7	1502350	6.4	West Europe	iii
iv	West Europe	1149904	4.8	729992	3.1	South-East As	iv
v	CIS	778239	3.3	554773	2.4	CIS	v
vi	Near East	715385	3.0	307049	1.3	Near East	vi
vii	C&E Europe	697603	2.9	182323	0.8	C&E Europe	vii
viii	South Asia	480693	2.0	142763	0.6	S-E Europe	viii
ix	S-E Europe	72573	0.3	4519	0.0	South Asia	ix
	Section 1	**13407130**	**56.5**	**13041143**	**55.9**	**Section 1**	
	Section 2		**America and Partners**			**Section 2**	
i	United States	3949711	16.7	4842484	20.8	United States	i
ii	United Kingdom	1557942	6.6	1791034	7.7	United Kingdo	ii
iii	Caribbean	941864	4.0	884310	3.8	Caribbean	iii
iv	Canada	806876	3.4	880369	3.8	Canada	iv
v	Africa	685774	2.9	130400	0.6	Central Ameri	v
vi	Central America	612043	2.6	129269	0.6	Africa	vi
vii	Australia	532168	2.2	124184	0.5	Australia	vii
viii	New Zealand	45474	0.2	12035	0.1	New Zealand	viii
	Section 2	**9131852**	**38.5**	**8794084**	**37.7**	**Section 2**	
	Section 3		**Japan in Pacific**			**Section 3**	
i	South America	1569816	6.6	1449344	6.2	Japan	i
ii	Japan	120363	0.5	326513	1.4	South Americ	ii
iii	Oceania	28356	0.1	10786	0.0	Oceania	iii
	Section 3	**1718535**	**7.2**	**1786643**	**7.7**	**Section 3**	
	World					**World**	
	effective(S1+S2)	**24257517**	**102.3**	**23621870**	**101.3**	**effect(S1+S2)**	
	estimated	**23715169**	**100.0**	**23310847**	**100.0**	**estimated**	
	Diff.-errors	**542347**	**2.3**	**311024**	**1.3**	**Diff.-errors**	

* Cumulated stocks for the 1990-2015 interval (see also *Andrei & Andre*i 2019, pp. 17-22).

**Accounted in/for the same year – no money depreciation considered.

Data source: our calculations on the *WIR-2016* data.

Annex 5

Capital flows' dynamics along the 1990-2015 interval by the 20 important world entities

A/ Direct connections (possible/ see the corresponding colours on both flow senses)

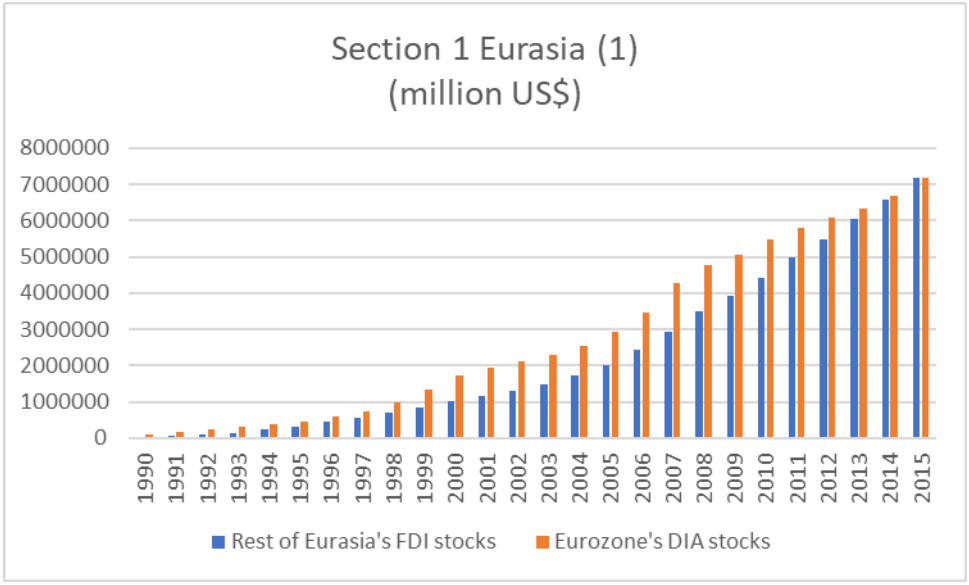
		FDI	DIA		
i	East Asia	8.6	8.1	United States	i
ii	South America	4.2	6.2	East Asia	ii
iii	Caribbean	3.8	4.5	Caribbean	iii
iv	CIS	3.3	2.4	CIS	iv
v	Near East	2.6	2.2	South-East Asia	v
vi	C&E Europe	2.5	1.6	Near East	vi
vii	Africa	1.5	1.6	Canada	vii
viii	Central America	1.1	0.9	South America	viii
ix	South-East Europe	0.3	0.8	C&E Europe	ix
x	Oceania	0.0	0.6	South Asia	x
xi	South Asia	1.9	0.5	Central America	xi
xii	West Europe	-0.1	0.5	Australia	xii
xiii	Canada	-0.3	0.3	United Kingdom	xiii
xiv	Japan	-0.4	0.3	Africa	xiv
xv	New Zealand	-0.6	0.0	South-East Europe	xv
xvi	South-East Asia	-0.6	0.0	Oceania	xvi
xvii	Australia	-1.6	-0.9	New Zealand	xvii
xviii	Euro-zone	-4.6	-3.8	West Europe	xviii
xix	United States	-7.0	-6.5	Euro-zone	xix
xx	United Kingdom	-8.3	-14.6	Japan	xx
	errors	**6.2**	**4.6**	**errors**	

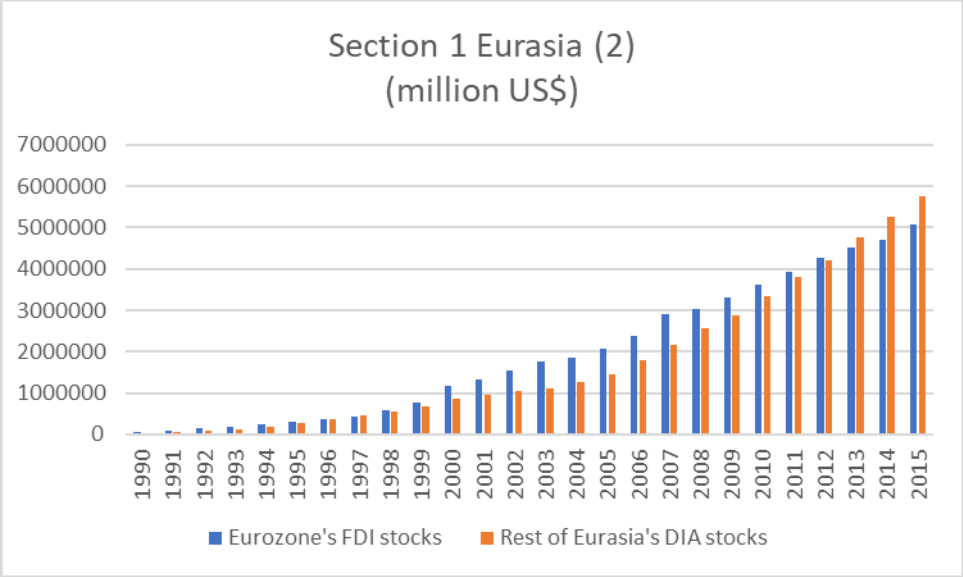
B/ Indirect connections (see the corresponding colours on the same flows sense)

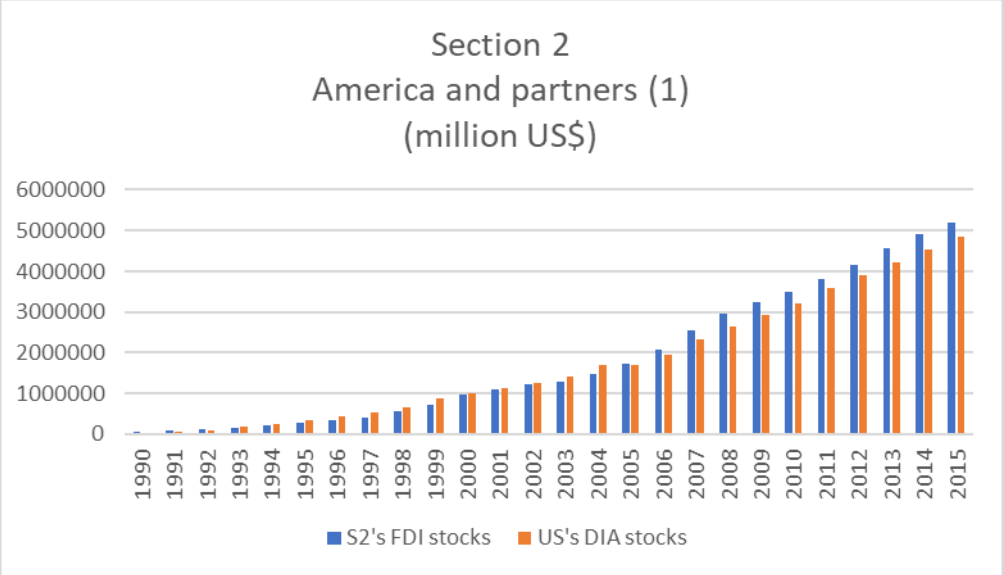
		FDI	DIA		
i	East Asia	8.6	8.1	United States	i
ii	South America	4.2	6.2	East Asia	ii
iii	Caribbean	3.8	4.5	Caribbean	iii
iv	CIS	3.3	2.4	CIS	iv
v	Near East	2.6	2.2	South-East Asia	v
vi	C&E Europe	2.5	1.6	Near East	vi
vii	South Asia	1.9	1.6	Canada	vii
viii	Africa	1.5	0.9	South America	viii
ix	Central America	1.1	0.8	C&E Europe	ix
x	South-East Europe	0.3	0.6	South Asia	x
xi	Oceania	0.0	0.5	Australia	xi
xii	West Europe	-0.1	0.5	Central America	xii
xiii	Canada	-0.3	0.3	United Kingdom	xiii
xiv	Japan	-0.4	0.3	Africa	xiv
xv	South-East Asia	-0.6	0.0	South-East Europe	xv
xvi	New Zealand	-0.6	0.0	Oceania	xvi
xvii	Australia	-1.6	-0.9	New Zealand	xvii
xviii	Euro-zone	-4.6	-3.8	West Europe	xviii
xix	United States	-7.0	-6.5	Euro-zone	xix
xx	United Kingdom	-8.3	-14.6	Japan	xx
	errors	**6.2**	**4.6**	**errors**	

Annex 6

International capital stocks year-by-year evolving on Sections, in absolute US$ amounts invested (1990-2015)




Section 1 Eurasia (2)
(million US$)
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Eurozone's FDI stocks
Rest of Eurasia's DIA stocks


Section 2
America and partners (1)
(million US$)
6000000
5000000
4000000
3000000
2000000
1000000
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
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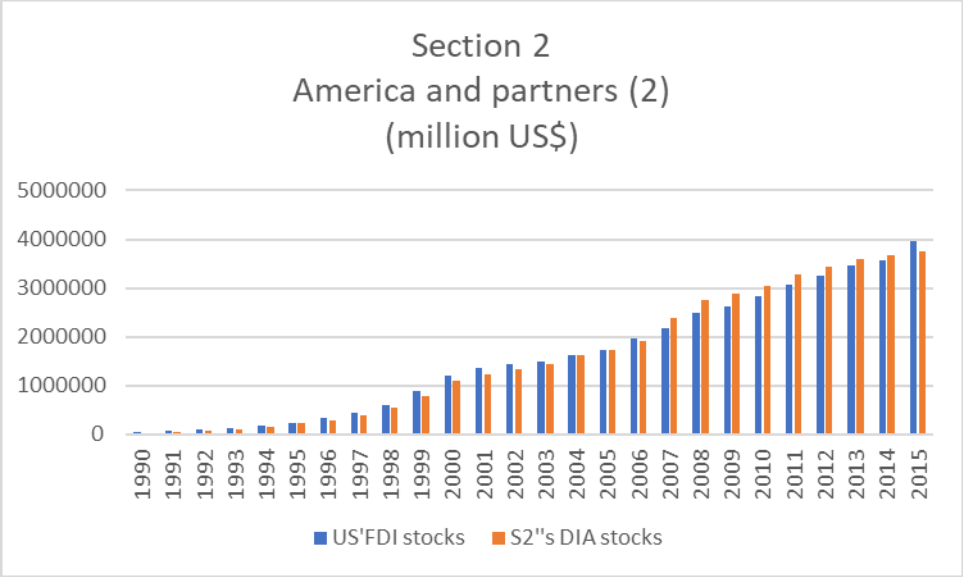
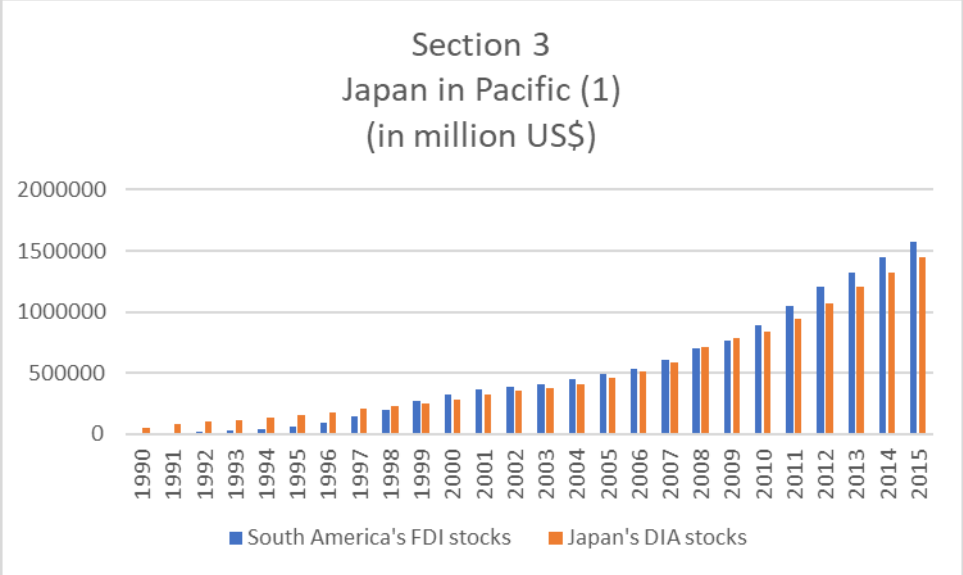
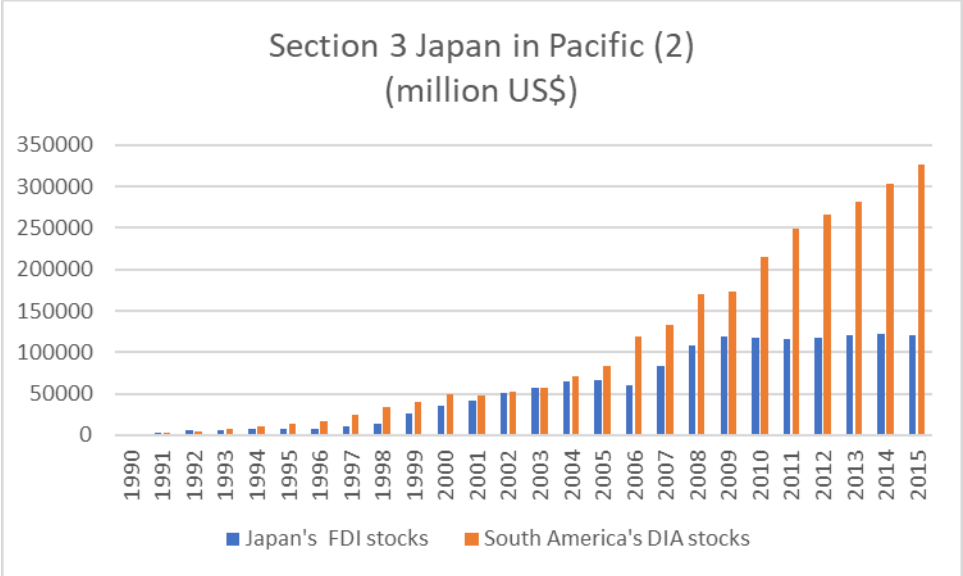
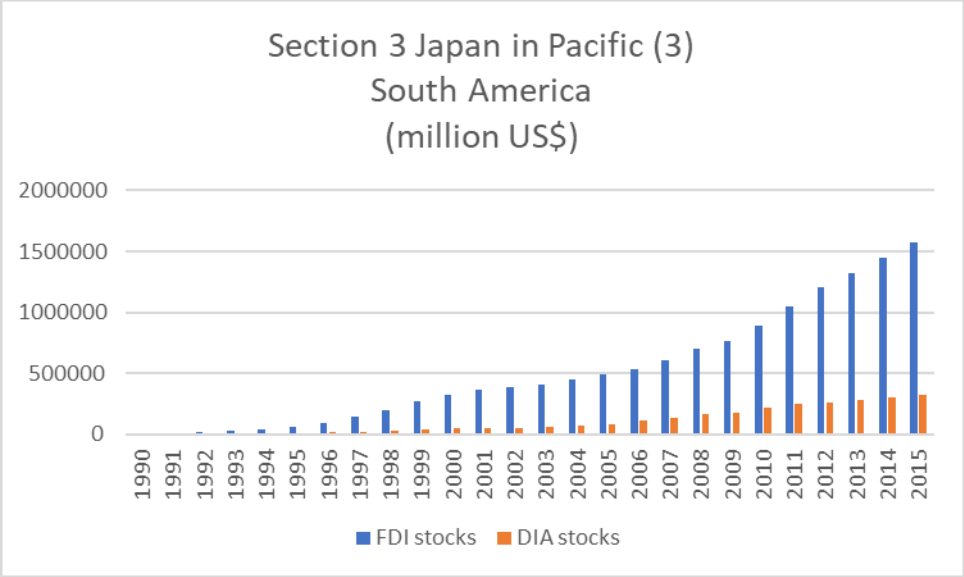
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
S2's FDI stocks
US's DIA stocks


Section 2
America and partners (2)
(million US$)
5000000
4000000
3000000
2000000
1000000
0
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
US'FDI stocks
S2"s DIA stocks


Section 3
Japan in Pacific (1)
(in million US$)
2000000
1500000
1000000
500000
0
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
South America's FDI stocks
Japan's DIA stocks


Section 3 Japan in Pacific (2)
(million US$)
350000
300000
250000
200000
150000
100000
50000
0
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
Japan's FDI stocks
South America's DIA stocks



Annex 7

World entities' international capital positions along the 1990-2015 interval

Foreign direct investments (FDI)

	1990	1994	2000	2010	2015
i	Euro-zone	Euro-zone	United States	Euro-zone	Euro-zone
ii	United States	United States	Euro-zone	United States	United States
iii	United Kingdom	East Asia	East Asia	East Asia	East Asia
iv	South-East Asia	United Kingdom	United Kingdom	United Kingdom	South America
v	West Europe	South-East Asia	West Europe	South America	United Kingdom
vi	East Asia	West Europe	South America	West Europe	South-East Asia
vii	Australia	South America	South-East Asia	South-East Asia	West Europe
viii	Canada	Central America	Canada	Canada	Caribbean
ix	South America	Canada	C&E Europe	C&E Europe	Canada
x	Central America	Australia	Central America	CIS	CIS
xi	Africa	Africa	Africa	Near East	Near East
xii	Japan	C&E Europe	Caribbean	Caribbean	C&E Europe
xiii	New Zealand	Near East	Australia	Africa	Africa
xiv	Near East	New Zealand	CIS	Central America	Central America
xv	C&E Europe	Japan	Japan	Australia	Australia
xvi	Caribbean	Caribbean	Near East	South Asia	South Asia
xvii	Oceania	CIS	South Asia	Japan	Japan

xviii	South Asia	South Asia	New Zealand	South-East Europe	South-East Europe
xix	South-East Europe	Oceania	South-East Europe	New Zealand	New Zealand
xx	CIS	South-East Europe	Oceania	Oceania	Oceania

Direct investments abroad (DIA)

	1990	1994	2000	2010	2015
i	Euro-zone	Euro-zone	United States	Euro-zone	Euro-zone
ii	Japan	United States	Euro-zone	United States	United States
iii	United States	Japan	United Kingdom	United Kingdom	East Asia
iv	West Europe	United Kingdom	West Europe	East Asia	United Kingdom
v	United Kingdom	East Asia	East Asia	West Europe	West Europe
vi	East Asia	West Europe	Japan	Japan	Japan
vii	Canada	Canada	Canada	Canada	Caribbean
viii	New Zealand	South-East Asia	Caribbean	Caribbean	Canada
ix	South-East Asia	South America	South-East Asia	South-East Asia	South-East Asia
x	South America	Australia	South America	CIS	CIS
xi	Africa	Caribbean	Australia	South America	South America
xii	Central America	Africa	Africa	Near East	Near East
xiii	Australia	New Zealand	CIS	Australia	C&E Europe
xiv	South Asia	CIS	New Zealand	South Asia	South-East Europe
xv	C&E Europe	Central America	C&E Europe	C&E Europe	Central America
xvi	Oceania	C&E Europe	Central America	Africa	Africa
xvii	South-East Europe	Oceania	Near East	Central America	Australia
xviii	CIS	South Asia	South Asia	New Zealand	New Zealand
xix	Near East	South-East Europe	Oceania	Oceania	Oceania
xx	Caribbean	Near East	South-East Europe	South-East Europe	South Asia

Annex 8

Capital flows' dynamics along the 1990-2015 interval priory by FDI significant individual countries and regions
(percentage points/PP)

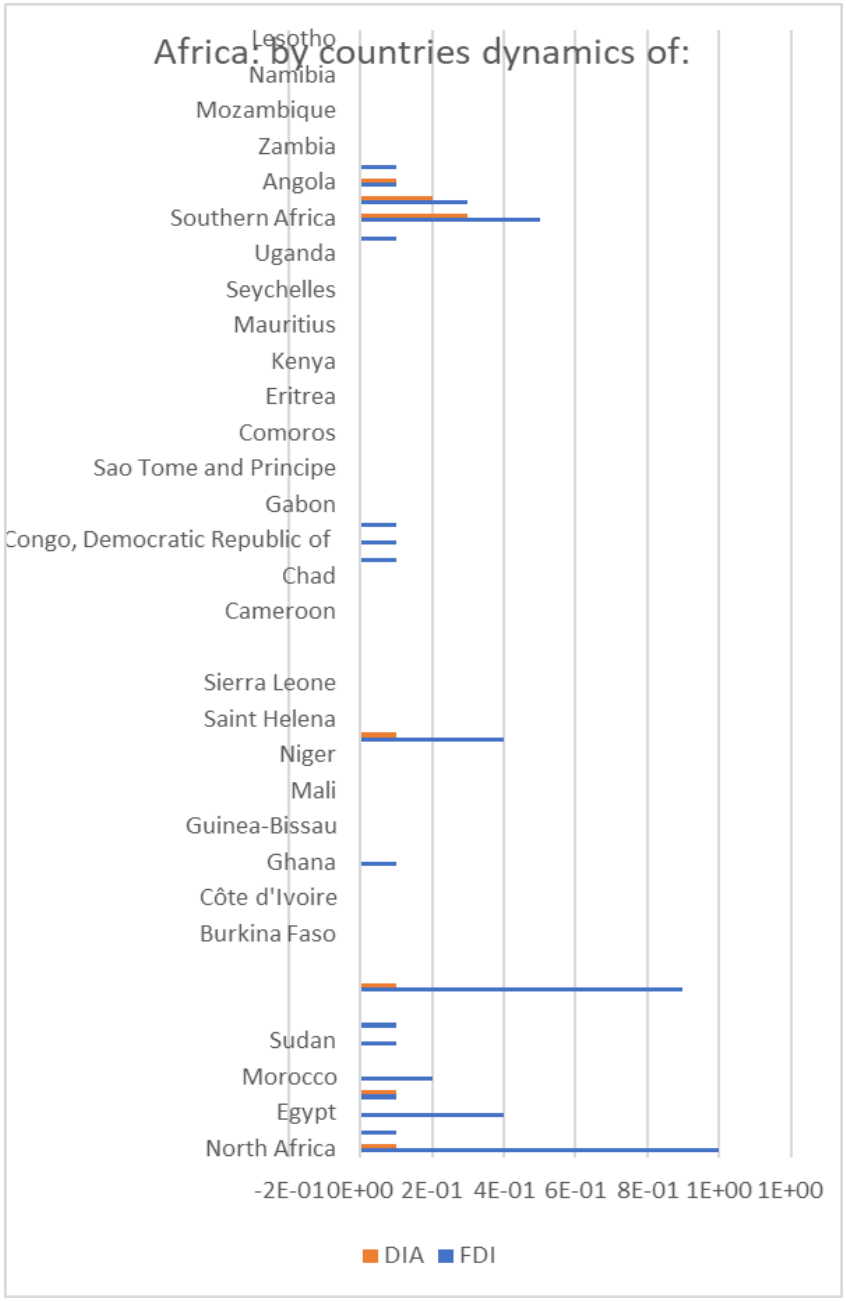
S/R	Region/country	FDI	DIA	Region/country	S/R
	World 2015	**1.6**	**3.2**	**World 2015**	
I	**Eurasia (total)**	**3.2**	**2.2**	**Eurasia (total)**	**I**
I+	**Eurasia (+)**	**28.1**	**21.2**	**Eurasia (+)**	**I+**
1+	**East Asia (+)**	**8.6**	**8.2**	**Eurozone (+)**	1+
	China	5.6	2.5	Spain	
	Hong Kong	2.9	1.7	Belgium	
	South Korea	0.1	1.5	Luxembourg	
2+	**Eurozone (+)**	**8.1**	1.4	Ireland	
	Germany	2.1	0.3	Austria	
	Belgium	2.1	0.3	Malta	
	Ireland	1.4	0.2	Cyprus	
	Luxembourg	1.3	0.2	Portugal	
	Malta	0.8	0.1	Greece	
	Austria	0.3	**6.2**	**East Asia (+)**	2+
	Finland	0.2	2.5	Hong Kong	
	Cyprus	0.1	2.4	China	
3+	**Near East(+)***	**2.6**	0.8	South Korea	
4+	**C&E Europe(+)***	**2.5**	0.5	Taiwan	
5+	**CIS (+)**	**1.9**	**2.2**	**CIS (+)**	3+
	Russian Federation	1.9	2.2	Russian Federation	
6+	**South Asia(+)**	**1.4**	**1.6**	**Near East(+)***	4+
	India	1.4	**1.4**	**South-East Asia(+)**	5+
7+	**West Europe(+)**	**0.6**	0.9	Singapore	
	Denmark	0.6	0.3	Indonesia	
	Sweden	0.0	0.2	Thailand	
8+	**South-East Euro(+)***	**0.3**	**0.8**	**C&E Europe(+)***	6+
9+	**South-East Asia(+)**	**0.2**	**0.6**	**South Asia(+)**	7+
	Singapore	0.1	0.6	India	
	Indonesia	0.1	**0.6**	**West Europe (+)**	8+
			0.4	Denmark	
			0.2	Sweden	
			0.0	**South-East Europe(+)***	9+
I-	**Eurasia (-)**	**-23.1**	**-18.8**	**Eurasia (-)**	**I-**
1-	**East Asia**	**-0.2**	**-4.5**	**West Europe (-)**	8-
	Taiwan	-0.2	-1.8	Switzerland	
9-	**South-East Asia (-)**	**-0.6**	-2.7	Norway	
	Thailand	-0.6			

7-	**West Europe (-)**	**-1.2**	**-14.9**	**Eurozone (-)**	1-
	Norway	-0.1	-0.4	Finland	
	Switzerland	-1.1	-0.7	Italy	
10-	**United Kingdom**	**-8.3**	-0.9	Netherlands	
2-	**Eurozone (-)**	**-12.7**	-3.2	Germany	
	Greece	-0.3	-9.8	France	
	Portugal	-0.7			
	Italy	-1.6			
	Netherlands	-2.1			
	Spain	-2.6			
	France	-5.3			
II	**America& partners**	**-5.2**	**0.2**	**America& partners**	**II**
11	**Caribbean**	**3.5**	**8.1**	**United States**	10
	British Virgin Islands	2.6	**4.6**	**Caribbean**	11
	Cayman Islands	0.9	4.2	British Virgin Isla	
12	**Central America**	**0.8**	0.4	Cayman Islands	
	Mexico	0.8	**1.6**	**Canada**	12
13	**Africa****	**0.4**	**0.5**	**Australia**	13
	South Africa	0.4	**0.4**	**Central America**	14
	Morocco	0.1	0.4	Mexico	
	Egypt	0.0	**0.3**	**United Kingdom**	15
	Libya	0.0	**0.1**	**Africa****	16
	Nigeria	-0.1	0.2	South Africa	
14	**Canada**	**-0.3**	0.0	Libya	
15	**Japan**	**-0.4**	0.0	Egypt	
16	**New Zealand**	**-0.6**	0.0	Morocco	
17	**Australia**	**-1.6**	-0.1	Nigeria	
18	**United States**	**-7.0**	**-0.9**	**New Zealand**	17
			-14.6	**Japan**	18
III	**Japan in Pacific**	**3.7**	**0.8**	**Japan in Pacific**	**III**
19	**South America**	**3.6**	**0.8**	**South America**	19
	Brazil	2.8	0.5	Chile	
	Chile	0.6	0.2	Brazil	
	Peru	0.4	0.1	Argentina	
	Argentina	-0.1	0.0	Peru	
	Venezuela	-0.1	-0.1	Venezuela	
20	**Oceania**	**0.1**	**0.0**	**Oceania**	20
	Papua New Guinea	0.1	0.0	Papua New Guinea	
	Cook Islands	0.0	0.0	Cook Islands	
x	**World 1990**	**3.9**	**3.3**	**World 1990**	**x**

* Regions with unanimously positive dynamics are here accounted with their corresponding total amounts.

** Africa was here preferred by its FDI&DIA dominant countries in their regions.

Annex 9


Africa: by countries dynamics of:
Lesotho
Namibia
Mozambique
Zambia
Angola
Southern Africa
Uganda
Seychelles
Mauritius
Kenya
Eritrea
Comoros
Sao Tome and Principe
Gabon
Congo, Democratic Republic of
Chad
Cameroon
Sierra Leone
Saint Helena
Niger
Mali
Guinea-Bissau
Ghana
Côte d'Ivoire
Burkina Faso
Sudan
Morocco
Egypt
North Africa
-2E-01 0E+00 2E-01 4E-01 6E-01 8E-01 1E+00 1E+00
DIA
FDI

Annex 10

Synopsis of the model

(model on the international capital directly invested's mechanism)

the theory:

name:	***theory of international investments***
theorists:	Dalina Andrei & Liviu C Andrei
enunciation:	***object:*** *international - between countries - capital invested by individual amounts, as basically world-owned*
	subjects: *individual countries -- that might group into multi-country regions, then into capital sections*

the model:

Ord	Mathematically	Literally	
0	aX = aY	**assumptions & conditions /// transactions**	
		basically: *Country X -- the investment recipient -- receives from country Y -- the investor -- the 'a' amount invested.*	
1	∑FDI i = ∑ DIAi	**I. model one:**	
		A. static hypostasis:	
		i are the world countries	**basic assumption**
	NYn = OYn	**detail:**	
		∑ =∑(i=1 → n)	*At the world level, the total of investments received is the same with the total of amounts invested by the same world countries -- i.e. both identify the same capital flows.*
		details:	
	$KNY^n = KOY^n$	*N being the total amounts received in year n (Yn), the same for O, as amounts invested , the equality is valid on/ for each time period.*	
	KN Yn = NY1 +NY2+NY3+…+NYn	*The same for accumulated stocks(K) up to the year n.*	
	KO Yn = OY1 +OY2+OY3+…+OYn	*In which stocks are flows accumulated from year 1 to year n for both the amounts received and invested.*	
		the same, in terms of FDI stoc balances:	
2	$\sum KBiY^n = \sum (KNi\ Y^n - KOi\ Y^n) = 0$	*Formula (1) re-written makes the null sum of the countries' balances of FDI stocks, world-wide,*	
	KBiYn = (KNi Yn - KOi Yn) ≠ 0	*even when individual balances of FDI stocks are not null.*	
		B. dynamic hypostasis:	
		details:	
	∑KNiYj x 100%/	*Since the weight of country i's (%) FDI stocks in total*	

	KNworldYj = 100	*world FDI stocks in moment j = KNiYj x 100%/ KNworldYj: the same for DIA,*
	∑KOiYj x 100%/ KOworldYj = 100	*The total sum of countries' FDI&DIA percentages in total world stocks make 100% on each of FDI and DIA as independently from one-another:*
	DYNi(n/o)= KNiYn x 100%/ KNworldYn– KNiYo x 100%/ KN world Yo	*While the difference of percentages of country i between two moments for both FDI & DIA = the dynamic:*
	DYOi(n/o)= KOiYn x 100%/ KOworldYn– KOiYo x 100%/ KO world Yo	
3	∑DYNi(n/o)= 0 ∑DYOi(n/o)= 0	**enunciation:**
		The countries' FDI dynamics between the same time moments make the null sum.
		The same for DIA.
		remark (1): *despite equations (3) -- i.e. its separate results on the FDI and DIA flows -- the equality between world dynamics of FDI and DIA on the same interval is automatically ensured.*
		remark(2): *dynamics here considered are neither physical nor even in dollar-value assessed, but the individual dynamics compared to the whole world capital invested's volume.*
		corollary: *an individual (country) FDI&DIA dynamic might be both positive -- with no "explosive" of capital invested, when other countries do even less -- and negative -- when its impressive investments' growth concomitant with other countries doing it better.*
4	Tv i= 1/2(FDIi + DIAi)	**II. model two:**
		basically:
		turnover
		Turnover (Tv) makes the direct connection between model one and model two:
		Tv is the half of the sum between the country's international investments' inflows (FDIi) and outflows (DIAi) -- i.e. the other half of this summing will belong to the investment partner country, see Theorem 1.
4'	Tv world = ∑ [1/2 (FDIi + DIAi)] = FDI world = (-) DIA world	*Turnover (Tv) reaches its full significance at the world level, where it equals both FDI and DIA levels.*
		*Back to individual country**(details):***
		cooperation capital and long-way flows:
		Ccp is the lower amount between the ones of FDIi - inflows and DIAi - outflows.
		Lwf is the difference between the FDI-inflows and DIA-outflows, i.e. The FDI stock balance of counytry i, but always as positive amount, the same as Tv and Ccp for the unitary basis model.
5	1/2 Tv i = Ccpi + 1/2 Lwfi	*The half of the country's turnover (1/2 Tvi) is the sum of corresponding cooperation capital (Ccpi) and the half of*

		long-way flows (Lwfi).		
5'	Tv world =∑ Tv i =∑ Ccp i +∑ Lwf i	*At the world level, turnover (Tv world) cumulates individual turnovers of countries, that also equals cooperation capital and long-way flows cumulated of the same individual countries.*		
		Remark (1): *the same as turnover (Tvi), the country's long-way flows (Lwfi) account by their half-amount and basing on the same principle -- i.e. The other half-amount is accounted by the investment partner countries, see Theorem 2.*		
		Remark (2): *correspondingly, for cooperation capital (Ccp) its basic principle -- i.e. different than the one in the Lwf's and Tv's cases, also related to the two theorems -- is that of equal amounts accounted by each of the investment partner countries.*		
		Remark (3): *the cooperation capital at world level stops being double in the corresponding equality, as compared to the individual country's above description.*		
		Remark(4): *all these above for the same time interval: j=1 →m, in which j is the number of successive years here considered.*		
		by types of regions:		
		basically:		
		Any country's international investment (DIA) goes priory to the region around.		
		All FDI&DIA flows within the region are cooperation capital (Ccp).		
		the [a] type:		
6	∑FDI(X2,3.,….n) ≤ DIA (X1)	*Net recipient regions with one or more FDI&DIA dominant countries -- i.e. this can be one country (X1) or a restricted country group (n'<ν).*		
		specific transactions (I)		
7	c X1 = cZ	*Be X1, X2, X3,...Xn the countries of the region -- only X1 receives Lwf from great investors from the rest of world (country Z).*		
8	a2X2 + a3X3+...+anXn = a X1	*a = a2 + a3+...+an. Here a1 is missing, as part of the long-way flow initially received by dominant countries X1.*	*[a < c]*	*Then country X1 re-invests in the rest of region R1 part of the c amount received.*
9	a'X1 = a'2X2 + a'3X3 +... +a'n Xn	*a' = a'2+a'3 +...a'n*	*[a' ≤ a]*	*Then, the rest of region does invest back part of the capital previously received cooperation capital - Ccp -- on the short-middle term.*
10	c' Z = c' X1	*c' ≤ c*	*Country X1 invests back into the investor country (off Region R1) part of the capital previously received -- cooperation capital, Ccp --on the short-middle term.*	

11	dV = d Xi	*A certain country Xi, in region R1, invests outside the region (country V).*	
12	d'Xi = d' V	*d' ≤ d*	*Country V , outside region R1 and previously receiving d amount invested from country Xi, inside R1, invests back in country Xi part of the capital previously received in the short-middle terme.*
		See results in the [a] type region working, except for the final d and d' amounts invested in Table 1.	

Table 1

item	X1	Xi	Reg. 1	Z	world
FDI	*c+a'*	*ai*	*c+a+a'*	*c'*	*(c+c') +(a+a')*
DIA	*a+c'*	*a'i*	*a+a'+c'*	*c*	*(c+c') +(a+a')*
FDIStckBal	*(c-c')-(a-a')*	*ai - a'i*	*c-c'*	*c'-c*	*0*
Lwf	*|(c-c')-(a-a')|*	*ai – a'i*	*c-c'*	*|c'-c|*	*2(c-c')*
Ccp	*a+c'*	*a'i*	*a+a'+c'*	*c'*	*a+a'+2c'*
Tv	*½[(c+c')+(a+a')]*	*1/2 (ai +a'i)*	*½(c+c')+(a+a')*	*1/2 (c'-c)*	***(c+c') +(a+a')***

Comments on Table 1: *The table respects the model assumptions, e.g.:*
FDI stock balances (FDIstckBal) make the null sum on world.
FDI stocks balances (FDIstckBal) get individually into long-way flows (Lwf), but these need to be expressed by module numbers.
Long-way flows equal FDI stock balances, except for the world level.
Calculations proper to model requirements find the world turnover equal to both FDI and DIA at world level.
This result will then obviously adapt to the last double d and d' amounts recorded, be they investments (DIA) made by X1 or other Xi country.
Result will be the same when country X1 will be dominant together with other (i') countries -- i.e. a dominant countries' group.
In the practice -- out of the model --, the Russian Federation case in the CIS region proves equally the country X1 with negative FDI stocks balance.

		the [b] type:
		Dominant cooperation capital between countries of the region
		Be Y1, Y2, Y3,...Y(n-1), Yn the countries of the region -- each country invests in another country, while amounts invested as intra-region Ccp might be different levels.
		Be also the amounts invested: b1>b2>b3>...>bn and correspondingly: b1'>b2'>b3'>...>bn'.
13	b1(Y2)=b1(Y1) b2(Y3)=b2(Y2) b3(Y4)=b3(Y3) ... b(n-1)(Yn)=b(n-1)[Y(n-1)]	**specific transactions (II)**

	bn (Y1) = bn (Yn) ……		
14	b1'(Y1) = b1'(Y2) b2'(Y2)=b2'(Y3) b3'(Y3) =b3'(Y4) … b(n-1)' [Y(n-1)] = b(n-1)' Yn bn'(Yn)=bn'(Y1)	b'i ≤ bi *And each country invests back in its previous country according to the same cooperation capital rules seen above in the [a] type region.*	

Table 2

item	**Y1**	**Y2**	**Y3**
FDI	*bn+b1'*	*b1+b2'*	*b2+b3'*
DIA	*b1+bn'*	*b2+b1'*	*b3+b2'*
FDIStckBal	*(bn-bn')-(b1-b1')*	*(b1-b1')-(b2-b2')*	*(b2-b2')-(b3-b3')*
Lwf	-	-	-
Ccp	-	-	-
Tv	*1/2[(bn+bn')+(b1+b1')]*	*1/2 [(b1+b1')+(b2+b2')]*	*1/2[(b2+b2')+(b3+b3')]*

item	**…**	**Yn-1**	**Yn**	***R2***
FDI	…	*b(n-2) + b(n-1)'*	*b(n-1)+bn'*	*b+b'*
DIA	…	*b(n-1)+b(n-2)'*	*bn+b(n-1)'*	*b+b'*
FDIStckBal	…	*[b(n-2) - b(n-2)'] - [b(n-1) - b(n-1)']*	*[b(n-1) - b(n-1)'] -(bn - bn')*	*0*
Lwf	…	-	-	-
Ccp	…	-	-	-
Tv	…	*1/2[b(n-2) + b(n-2)'] + 1/2[b(n-1) + b(n-1)']*	*1/2[b(n-1) + b(n-1)'] +1/2(bn + bn')*	*b+b'*

Comments on Table 2: *This table also respects the model assumptions, except for some minimal reservations e.g.:*
/While by definition there is only cooperation capital to talk about in a region with intra-FDI&DIA only, these FDI and DIA are equal.
/While by definition long-way flows are absent when only intra-region FDI&DIA flows -- i.e. these flows are entirely cooperation capital --, this appears true for the whole region and in a trend of flattening amounts of FDI stock balances of individual countries -- this assumption is reliable, except for residual Lwf on individual counttries.
/Plus, this occurs for both high and low -- i.e. differentiated -- FDI and DIA amounts on individual countries i.e. Flows and stocks of FDI&DIA by individual countries remain, as specific to an international capital basic rule.
/Only extra-region flows -- i.e. Long-way flows -- will bring real significant amounts' differentiation in such type of regions -- i.e. for both positive or negative FDI stock balances.

		by sections of international capital:
		Once more, for the time interval j=1→m, in which j always is a number of successive years in the interval considered.
		basic assumption:
17	∑FDI i ≅ ∑ DIAi	∑ =∑(i=1 → n) **the same, in terms of FDI stock balances:**
18	∑ KBiYn = ∑ (KNi Yn - KOi Yn) ≅0	*Formula (17) re-written : the null sum of the countries' balances of FDI stocks section-wide is approached.*
		the same, in terms of model two:
	∑FDI i ≅ ∑ DIAi ≅ ∑ Tv i	*The section's turnover does approach the total of sections's cumulated FDI and DIA.*
	∑Tv i = ∑ Lwf i + ∑ Ccpi	*The section's turnover equals the cumulative totals of long-way flows and cooperation capital of the same section.*
		Remark (5): *this is different than in the above formula (1) of model two -- i.e. The cooperation capital amount isn't here double any longer since its individual country components so were.*
19	∑Lwfi = ∑ |FDIstckBal(i)/cumulative (i=1 →n)|	*Long-way flows of the section calculates acording to the basic principle of model two -- in module numbers.*
		others, compulsorily:
		Both long-way flows and long distance cooperation capital.
		specific transactions (III)
20	(c) (major investors) = (c) (minor investors)	c is the amount invested.
		others, not compulsorily:
		International investors, as both minor and major.
		rest of the section's picture:
21	Tv =∑ Tvi	*Turnover of the section is the sum of individual country turnovers.*
22	Lwf = ∑ Lwf i	*Long-way flows of the section is the sum of individual country long-way flows.*
23	Ccp = ∑ Ccp i	*Cooperation capital of the Section is the sum of individual cooperation capitals of the countries.*
24	Lwf/all.investors = ∑ [Lwf/investors (i=1→n')]	Lwf/all investors< Lwf. & n' is the number of investor countries (n' <ν).
25	Lwf/all.investors/Double = 2 ∑ Lwf/all.investors	*The double of long-way flows of investor countries of the Section is searched for being compared to the total of long-way flows within the Section.*
26	Lwf/all.investors/Surplus = Lwf/all.investors/Double - Lwf	*Investors of a Section might also invest in the other Sections.*
		in sections with no major investors:
27	Tv/inter-reg./all.investors ≅ 1/2 Tv/ inter-reg.	*The international capital of investor countries is the same with the one of recipient countries.*
28	Tv/inter-reg./all. investors/surplus = Ccp/inter-reg/all investors/Surplus [-/+] ½	*[-/+] means/emphasizes that the deficit of FDIstockBal comes in favour of investor countries of the Section*

	Lwf/ all.investors /surplus	
29	Tv/inter-reg./all. investors/surplus = - / + ∑FDIstck.deficit	*The cumulated turnover surplus on the investors' side equals the same Section's FDI stocks deficit.*
		Remark(6): *surplus (above) might be both positive (+) and negative (- deficit).*
		Remark (7): *Ccp/inter-reg & Tv/ inter-reg get important within the Section, as distinct from their intra-region correspondents.*
		Remark (8): *both turnover and cooperation capital share into intra-region and inter-regions.*
		in sections with major & minor investors:
27'	Tv/inter-reg./major investors ≅ 1/2 Tv/ inter-reg.	*The international capital of major investor countries is the same with the one of recipient countries.*
		Remark (9): *formulae (27 & 27') stay also valid at the world level.*
	BS(h) = ∑ KBiYn = ∑ (KNi Yn - KOi Yn)	*The balance of FDI stocks of the Section arises from the approximation of the Section's equalities between FDI and corresponding DIA.*
30	∑ BS(h) = 0	**among sections, at the world level:**
		As a transcription of equation (2) above here comes the balances of cumulative FDI stocks of Sections.