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## **INTERNATIONAL ECONOMICS RESEARCH: STRUCTURAL CHANGES IN THE PAST 50 YEARS**

International economic relations are subject to evolution and structural changes. Economic research has been reflecting these changes, thus popularity of topics of research works is also subject to evolution. Popularity of certain topics among researchers has constantly been growing or decreasing. We may also observe other types of dynamics: decreasing popularity followed by its increase or vice versa, no obvious trend or frequent fluctuations. For example, global economic instability may be one of the factors. In particular there was a historical maximum in the ratio of frequency of words denoting crisis to frequency of words denoting development in 2010.

Trends in economic research have been analyzed in a number of studies. For example, Cardoso A. R., Guimarrés P., Zimmermann K. F. (2010) consider trends in regions or countries of origin of research articles on economic issues. Lopes I., Silva J. A., Rebelo E., Castela G. (2010) analyze trends in popularity of research directions in the field of tourism. Nascimento D., Teixeira A.A.C. (2010) consider trends in research topics and types of research devoted to the economics of innovation. Dan M.-C., Vasilache S. (2010) analyze frequency of topics related to lifestyle of people (including economic aspects of the issue).

In our research we aim to determine trends in relative popularity of research topics, particularly in the field of international economics. We use quantitative content analysis methods by means of calculating relative frequencies of words in titles of working papers and articles. Since the titles of the papers and articles were obtained from the RePEc database for economic research ([www.repec.org](http://www.repec.org)), we have analyses mainly western research works published during 1960-2010. Only articles or working papers with word international in their titles or abstracts were considered, to ensure that these works at least indirectly related to international economics.

Frequencies of each word in titles of the entire set of research works were calculated by using software (Wordstat). In our analysis we considered only words which occurred at least 50 times. Those words which are meaningless for the aim of our analysis were excluded (e.g., prepositions, articles, or such words as economic which express little information about particular field of research). We summed frequencies of words with similar meaning or different grammar forms of the same words. Since facilities do not allow us to fully consider this effect, we either tried to consider it while interpreting results or excluded such words from analysis when the distortion effect was too large. Also precision of results could have been influenced by using words in unusual meaning.

The minimum period for comparing frequencies is 1 year (for most recent research works,

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which occur more frequently in the database unlike earlier works) or longer periods (for earlier works) to smooth the difference in number of works in the compared periods. Owing to specifics of the search engine some works were counted twice in adjacent periods (e.g., works in 1985 were counted both in periods 1980-85 and 1985-1990).

Further in the analysis we used relative frequencies of words (with the respect to the total number of words in a period considered) in per mille rates (‰). We may assume that the distortion effect of meaningless words was insignificant, because fluctuation of total relative frequencies of all meaningful words occurring frequently enough was small in various periods. But we should consider such effect in case we take the word international for a meaningless word. E.g., frequencies in 1960-80 are smaller by 6% than in 1991-96 owing to existence of meaningless words.

Since words may differ in total absolute frequencies during the entire period 1960-2010, we applied longer periods for comparison in case such frequencies were small enough. E.g. if the total absolute frequency of a word is at least 300, we may find an apparent trend only if we use periods no shorter than 1960-80, 1980-90, 1991-96, 1997-2000, 2001-03, 2004-06, 2007-08, 2009-10. If the total absolute frequency of a word is at least 1000 we may use shorter periods. If the total absolute frequency of a word is about 150 we should use smaller number of longer periods. If the total absolute frequency of a word is 50 it is difficult to find an apparent trend for changes in its popularity, but we used such words for analysis of trends in popularity of word groups instead of single words.

Whenever it was necessary to combine periods, relative frequencies for larger combined periods were calculated as averages of relative frequencies of each period to be combined (regardless of number of years in each period). E.g. after combining periods 1960-80 (with the relative frequency of a word 5 ‰) and 1980-90 (9‰) the average is 7‰. This method considers the fact that later periods contain more cases (research works) and thus we should apply higher weight for them.

We used chi-square test for significance in differences in frequencies for all the periods considered. But we did not used the test automatically for interpreting results, because e.g. chi-square test may provide different results about significance of a fluctuation trend when different periods for comparison are used.

In our research trends in popularity of both individual words and word groups were analyzed. 3 levels of groups were used. Words were distributed among the groups considering closer semantic links. The following groups, subgroups, and subsubgroups were used:

- methodology - i.e. the group of words denoting specifics of methods used for research:
  - empirics;
  - future;
  - causality;
  - author method;
- geography:
  - international level (internationalization, integration);
  - local level (national, subnational);
- international trade:
  - trends in international trade;
  - international trade regulation;
- international finance:
  - capital mobility (equity investment, lending);
  - monetary (monetary policy, currency);

- macro-regulation:
  - role of state (public sector, private sector);
  - regulation;
  - government budget;
  - institutions;
  - law;
  - politics (conflicts);
- effect:
  - development;
  - efficiency;
  - danger (balancing, risk, crisis);
- market:
  - market structure (supply, demand);
  - competition;
- micro-level:
  - ownership;
  - firms;
  - management;
  - households;
- human:
  - labor;
  - demographics;
  - income distribution;
  - social issues (education);
- environment;
- economic sectors:
  - agriculture;
  - energy sector;
  - industry;
  - services;
  - real estate;
  - innovations;
- countries:
  - Asia;
  - advanced economies (Western Europe);
  - Central and Easter Europe;
  - developing countries (Latin America, developing Asia, Africa).

Some words may not belong to any subgroup or subsubgroup, e.g. group methodology includes the word model (including other forms: models and modelling) and several other independent words. Certain words may belong to two groups, e.g. prices.

Groups and subgroups	1960-80	1980-90	1991-96	1997-2000	2001-03	2004-06	2007-08	2009-10
<i>Methodology</i>	26.61	34.66	31.88	33.42	33.47	35.66	33.95	35.06
- empirics	2.24	5.89	7.21	8.95	8.18	9.07	9.36	9.06
- future	6.13	5.88	4.72	5.03	5.30	5.53	5.50	6.27
- causality	7.81	8.50	8.36	8.86	9.93	11.89	11.41	11.49

Groups and subgroups	1960-80	1980-90	1991-96	1997-2000	2001-03	2004-06	2007-08	2009-10
<b>Geography</b>	123.82	97.88	88.88	76.40	70.38	65.19	63.30	60.40
- international level	115.75	91.61	80.65	68.28	61.09	56.87	55.01	52.80
- international level (excl. <i>in-</i> <i>ternational</i> )	10.83	13.39	20.16	21.24	21.90	22.95	22.26	21.80
- local level	7.89	6.01	7.56	7.07	7.96	7.28	7.47	6.77
<b>International trade</b>	23.10	21.17	22.99	19.45	17.17	16.35	17.27	15.13
- trends	21.91	20.72	21.49	17.78	15.91	14.71	16.29	14.39
- regulation	1.19	0.46	1.50	1.67	1.25	1.65	0.98	0.74
<b>International finance</b>	61.66	62.20	56.81	61.29	54.01	51.54	47.92	48.56
- capital mobility	24.62	29.28	32.30	32.49	28.18	26.82	23.91	22.57
- monetary	30.86	28.42	19.34	21.20	17.65	17.46	16.16	15.27
<b>Macro-regulation</b>	31.87	42.15	45.14	42.88	43.97	41.28	39.30	36.36
- role of state	2.82	3.65	4.76	5.33	6.27	6.18	5.23	5.51
- regulation	10.44	18.34	19.36	18.30	17.35	16.96	15.89	14.48
- government budget	4.86	11.23	10.99	8.96	7.96	6.88	6.94	6.35
- institutions	6.03	2.68	4.30	4.67	5.72	4.78	4.58	3.60
- law	1.94	2.10	1.26	1.90	2.23	2.86	2.76	2.87
- politics	5.78	4.13	4.46	3.73	4.45	3.61	3.91	3.55
<b>Effect</b>	28.86	34.79	43.14	43.85	42.93	43.56	43.53	47.24
- development	9.25	6.99	10.11	10.68	9.82	9.88	9.37	9.30
- efficiency	10.95	14.05	18.55	18.09	20.10	21.06	21.61	19.52
- danger	8.66	13.75	14.48	15.08	13.01	12.62	12.55	18.42
<b>Market</b>	21.19	23.62	26.59	23.36	23.89	22.00	23.42	21.78
- market structure	13.26	12.43	11.98	9.66	9.85	10.31	10.92	10.34
- competition	1.49	3.07	3.90	3.06	3.35	2.38	2.34	1.97
<b>Micro-level</b>	9.40	6.44	9.23	11.73	13.39	13.60	13.02	15.48
- ownership	0.37	0.15	1.01	1.12	1.49	1.40	1.02	1.10
- firms	6.46	3.60	4.56	5.66	6.80	6.67	6.52	8.67
- management	2.45	2.36	2.64	4.22	4.40	4.63	4.43	4.60
- households	0.13	0.33	1.02	0.73	0.69	0.90	1.06	1.11
<b>Human</b>	11.34	15.10	19.32	19.80	20.12	22.36	22.07	22.12
- labor	3.80	4.42	6.04	6.43	5.97	5.70	5.60	5.03
- demographics	0.62	2.23	2.53	2.25	2.15	3.39	2.95	3.49
- income distribution	1.20	1.65	3.07	3.26	4.32	3.82	3.94	2.87
- social issues	5.02	6.58	6.78	7.04	6.81	8.33	8.39	9.72
<b>Environment</b>	2.11	2.71	7.70	8.73	9.52	7.97	9.13	10.15
<b>Economic sectors</b>	19.30	27.01	23.20	23.74	21.09	22.14	22.87	23.34
- agriculture	5.24	7.68	6.00	5.09	6.02	6.09	6.38	5.23
- energy sector	3.70	7.95	2.38	1.68	1.76	1.97	3.04	3.73
- industry	4.55	5.30	6.81	6.33	5.83	5.12	5.12	4.29
- services	1.35	2.79	3.08	3.55	3.82	3.75	3.59	4.25
- real estate	0.34	0.97	0.86	1.83	0.97	1.09	1.32	1.19
- innovations	6.30	6.73	7.68	8.47	7.64	8.37	7.83	8.04
<b>Countries</b>	12.99	13.55	21.10	25.30	27.73	27.02	27.70	28.37
- advanced economies	7.01	6.57	10.67	12.67	11.36	10.05	8.55	9.50
- Central and Eastern Europe	0.88	0.86	2.01	2.51	3.03	2.32	2.38	2.12
- developing countries	3.44	4.81	7.67	7.76	11.81	12.63	14.25	14.49

Trends in popularity of groups and subgroups are summarized in Table 1.

**Table 1.**  
**Dynamics of relative frequencies of word groups and subgroups in titles of research papers in the field of international economics in different years, %.**

Group methodology. There is no obvious trend regarding total relative frequency of all the words of this group, but that is not the case for its components. Research dealing with theory shows a downward trend (its relative frequency decreased three times from 1960-80 to 2007-10). We also observed a relatively downward trend for the word model (-s, -ling), and macroeconomic. Researchers started active use of information since the 1980s, but its maximum was reached in 1997-2003.

Subgroup empirics had showed an upward trend till the middle of the 1990s mainly due to the word evidence, but later its relative frequency stabilized. Correlation was mainly used in the 1990s. Other components of the subgroup (empirical, econometric) did not show any explicit trend. If we compare relative frequencies of theory and subgroup empirics, the latter has been definitely growing in popularity in comparison with theory.

There was a maximum for the subgroup future in 1975-80, mainly due to the word new, while forecast (-ing) showed downward dynamics. The subgroup causality had an upward trend due to the word effect (-s, impact, influence, consequences), while another component of the subgroup factor (determinant) showed a downward trend, interrupted by a local maximum in 2004-05.

In the subgroup author method different trends for its components and small absolute frequency do not allow us to treat downward trend in case of Ricardian and upward trend in case of Keynesian as reliable.

Group geography. There was a general downward trend for this group caused by large weight of the key word international. If we excluded this word, the relative frequency of the group would abruptly grow since 1990 (i.e. in 1991-2010 in comparison with 1960-90). The word geography (-ic) and spatial themselves reached maximum of their relative popularity at the beginning of the first decade of XXI century.

Subsubgroup internationalization (excluding the word international) has an upward trend. The same is true for its components: globalization (with the maximum in 2001-08), global, and outsourcing. The relative frequency of foreign fluctuated with the maximum in 1991. Free abruptly grew in popularity in 1991-96, but later it was a little less popular. The frequency of spillovers significantly grew in 1991. Mobility has become less popular since 2001.

The frequency of subsubgroup integration decreased twice in 1975-85, but later it grew in popularity three times. After the maximum was reached in 1985-93 there were two local maximums in 1999 and 2001, which apparently was caused by establishment of the EU and the euro area. It is interesting to note the sequence of maximums of various words of the subsubgroup: for coordination in 1980-90, convergence in 1991-96, cooperation in 1991-2000, harmonization in 1991-2003, integration in 2001-04, and accession in 2001-06.

There were several maximums in the subgroup local level, in particular in 1960-70, 1993, and 2002. Regional (both on the supra- and subnational level) had a minimum in 1980-90 and a maximum in 2001-03. Subsubgroup national showed a general downward trend, while subsubgroup subnational – an upward trend before 2001-10.

Group international trade. There is a downward trend for this group in general, and the subgroup trends in international trade (mainly owing to the word trade). But frequencies of export (-s, -ing) and trading had been growing till 2007-08.

There was a relative maximum for the subgroup international trade regulation in 1991-2006,



mainly due to WTO and GATT. Tariff and dumping had a rather downward trend.

Group international finance. The group shows rather a downward trend. But finance (-ial) and aid had the opposite trend.

Subgroup capital mobility reached its maximum in 1991-2000. Flows had two maximums: in 1960-80 and 1997-2000. Capital showed downward trend interrupted by a local minimum at the beginning of the 1980s and a local maximum in 1994. Asset reached its maximum in 1980-2003. Payments showed downward trend.

Subsubgroup equity investment reached its maximum in 1997 (or 1991-2006 if we use longer periods in our analysis). But its component FDI showed an upward trend. Subsubgroup lending had a maximum in 1991 (1980-92). Banks had two more maximums: in 1999-2002 and 2010. Bonds had become much more popular since the 1990s.

There was a downward trend for the subgroup monetary and its subsubgroups: monetary policy and currency. The latter also had a local maximum in 2000. Exchange reached its maximum in 1985-90, intervention – in 1980-96, currency – in 1997-2000. Dollar was much more popular before 1980.

Group macro-regulation. There was a maximum for this group in 1985-90. It is interesting to note that subsubgroups public sector and private sector had maximums almost in the same period of time: 2001-06 and 2001-03.

Subgroup regulation reached a maximum in 1980-2000. Some of its components reached their maximums later: liberalization and standards in 1997-2003, reform (-ing) in 1997-2006, regulation in 2001-06. Tariffs had a downward trend, while governance – an upward trend.

Subgroup government budget reached its maximum in 1985-92. Tax (-s, -ation) was most popular in 1991-96. Subgroup institutions had maximums in 1960-70 and 2001-05. The latter was also the maximum for its components: institutions (-al), OECD, WTO, GATT, and IMF.

Subgroup law was most popular in 2004-10, but also had local maximums before. The word law was most popular in 1960-90, thus the trend for the subgroup was mainly determined by other words, such as legal and corruption. Subgroup politics and the word politics (-al) had a general downward trend, but popularity of the subsubgroup conflicts fluctuated.

Group effect. The group had an unstable upward trend. Subgroup development had a minimum in the 1980s. The word development had a maximum in the 1960s and a minimum in 1994. Growth was most popular in the 1990s, especially in 1997, while it was least popular before the 1990s, as well as in 2000-01 and 2008-10. There we also an insignificant downward trend for industrialization, upward trend for GDP and maximum for output in the 1990s.

Subgroup efficiency had an upward trend, mainly due to effect. There were maximums for productivity in 1996-97 and 2003-04, efficiency in 1999 and 2003, competitiveness and quality in 1991-96 and 2007-08, benefit in 2001-06, costs in 2001-03. Income had a rather downward trend with maximums in the 1960s and 1991. Insignificant maximums include the one for wealth and earnings in the 1990's, and safety in 2001-06.

Subgroup danger had maximums in 1991, 1998-99, and 2009-10. Its subsubgroup balancing reached maximums at the beginning of the 1970s and in the 1980s. Balance and equilibrium showed an upward trend, while asymmetry and imbalances – a downward trend. There were insignificant maximums for stability in the 1980s and 2007-10 and minimums for security in 1991-97 and 2001-03.

The popularity of subsubgroup risk had been growing till 1991 before it slightly decreased. The word risk showed maximums in 1991, 1994, 2001 and 2007-10. Volatility had not been popular until the middle of the 1980s, and after that it fluctuated. As for insignificant results, uncertainty showed a downward trend, while vulnerability – an upward trend, also there were max-

imums for hedging in the 1990s and hazard in 2001-06.

Subsubgroup crisis had not been much popular before the middle of the 1980s and reached maximums in 1998-99, 2002, and 2009-10, largely owing to the word crisis itself. Cycles (-ical) were most popular in the 1990s, shocks – since the end of the 1990s. There were also insignificant maximums for recession (depression) in the 1990s and 2007-10, and for contagion in 2001-06. If we consider the ratio of frequency of the subsubgroup crisis to the subgroup development, it had maximums at the end of the 1980s, 1998-99, 2002, and 2009-10.

Group market. It had maximums in 1995 and 2001 together with the word market. Subgroup market structure reached its maximum in 1970-85, mostly due to price. Product (-s) was most popular in 1991-92, 1996, 2007. There were maximums for the subsubgroup supply at the end of the 1970s and 1995, but its components: output, production and supply reached insignificant maximums in different periods. Subsubgroup demand showed a rather downward trend, mostly owing to the word demand, while consumption had insignificant maximums in 1991-96 and 2009-10. Subgroup competition reached maximum in 1993-96, mostly due to the word competition.

Group micro-level. The group has an upward trend. Subgroup ownership had maximum in 2001-06. Subgroup firms showed an upward trend, except the maximum at the beginning of the 1970s. Subgroup management also had an upward dynamics, mostly due to management, governance, and entrepreneurship, while diversification had an insignificant downward trend. Popularity of subgroup households has been growing, except for the maximum in 1991-96.

Group human had a maximum in 2006-07, but the word human reached its maximum in the 1980s. There were maximums for the subgroup labor in 1993-98 and 2003-04, mostly due to the word labor. Popularity of the subgroup demographics had been growing before the beginning of the 1990s. Then it fluctuated before reaching its maximum in 2004-2010. Such a trend was mainly caused by the trend for subsubgroup migration. Subgroup income distribution showed a rather upward trend with maximums in 2000-02 and 2006-07, mainly due to inequality and poverty.

Subgroup social issues had been growing in popularity until 1992. Then it fluctuated before reaching another maximum in 2005-2010. In particular there was an upward trend for gender (women), cultural, child (-ren), pension (retirement), and insignificantly for society. Health reached a maximum in 1980-96 and fair – in 1960-90 and 2007-10. Subsubgroup education had maximums at the beginning of the 1970s, 1993, and 2010. The first maximum was due to university, and the second and the third ones – thanks to education. Students was most popular in 2007-10.

Group environment. Its frequency had been growing until the middle of the 1990s resulting in three maximums: in 1994-98, 2001-03, 2008-10. The first two ones are also maximums for the word environmental. Emissions reached maximum in 1997-2003 and 2007-2010. Sustainable (-ility) and climate had an upward trend. There also was insignificant dynamics: the minimum for natural and the maximum for pollution in the 1990s, and upward trend for water and renewable.

Group economic sectors. The group had maximums at the beginning of the 1980s and in 1997. Commodity showed a rather downward trend. There was also an insignificant minimum for goods in 2001-03 and low popularity of infrastructure before the 1990s.

Subgroup agriculture reached its maximum at the end of the 1980s and a local maximum in 2004. The first maximum was also relevant for the word agriculture (-al). Food had a maximum in 2008-09, while coffee – in the 1960-90s. Wine showed an upward trade. There was also an insignificant downward trend for fisheries and upward trend before 2007-2010 for dairy.

Subgroup energy sector had an absolute maximum at the beginning of the 1980s and a local maximum in 2008-10. The same dynamics was relevant for oil. The first maximum was also rel-

evant for energy. There was also a rather downward trend for coal and nuclear and insignificant upward trend for electricity and renewable.

Subgroup industry reached its maximum in 1992-98, mainly due to industry (-ial) and manufacturing. There was an upward trend for furniture, downward trend for subsubgroup metals, and insignificant downward trend for industrialization and automobile.

Subgroup services showed an upward trend, especially the word tourism (tourist). The word services was not much popular before the 1980s. Telecommunications showed a rather downward trend. There was also an insignificant upward trend for insurance and retail.

Subgroup real estate had an absolute maximum in 1996-99 and a local maximum in 2007-08. There were also an insignificant upward trend for construction and maximums for land and estate in the 1990s and housing in 2007-10.

Subgroup innovations was relatively more popular in 1995-98, 2002-05, and 2010, while technology (-cal) – at the beginning of the 1970s and in 1995-97, and research – in 1992. Innovation and knowledge have been growing in popularity before 2007-08. Patent was most popular in the 1980s before showing a fluctuating trend. There was also an insignificant upward trend for intellectual and ICT.

Group countries. The group showed an upward trend in general except the local maximum in 1991. In the 1990s frequency of emergent grew from almost zero. There was also a rather upward trend for subgroup Asia in general (with local maximums in 1995 and 1997).

There was an absolute maximum for advanced economies in 1991, while the local was in 1999. Canada (-ian) was more popular in 1985-91 and 1996, Japan (-ese) – in 1993-97, Australia – in 1991-2003. There was also an insignificant upward trend for USA and New Zealand, and before 2001-06 – for Singapore and Hong Kong.

Subsubgroup Western Europe reached its maximums in 1991 and 1999-2001, and local maximums in 2006 and 2010. European showed similar dynamics. But trends for particular countries may differ, e.g. France (French) was most popular near 1980. There were also an insignificant minimum for Britain (British, English) at the beginning of the 2000s and upward trend for Spanish, German, and Italy.

Subgroup Central and Eastern Europe was most popular in 1994, 1998, 2001-03, and 2005, while transition – in 1998-2002. There were also insignificant maximums for Poland in 1991-2006, Czech – in 2001-06, Bulgaria – since 2001, Turkey – since 2004, Soviet – before the 2000s.

Subgroup developing countries showed an upward trend. Subsubgroup Latin America had maximums in 1995, 2002, and 2004, while Brazil – in 2004. There were also insignificant results: Latin became more popular in the 1990s, Mexico was most popular in the 1980s and at the beginning of the 2000s, Colombia showed an upward trend. Subsubgroup developing Asia showed a definite upward trend with a local maximum in 1997. A similar dynamics was shown by China, India, and several other countries, while Pakistan had a maximum in the 1990s. There was a rather upward trend for subsubgroup Africa, but with a high volatility. Nigeria had a stable, but insignificant upward trend. If we consider the ratio of frequency of advanced economies to the frequency of developing economies, it has been decreasing, but the ratio was relatively bigger in the 1960s, at the end of the 1970s, 1991 and the second half of the 1990s.

Thus, trends in popularity of research topics may be mainly determined by the following factors: crises, international economic integration, changes in economic power of countries, increasing specialization of research and interdisciplinary approach, changes in economic structure, bubbles in the markets, and growing concern about environment. Further research may involve quantitative estimation of the effect of these factors.



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