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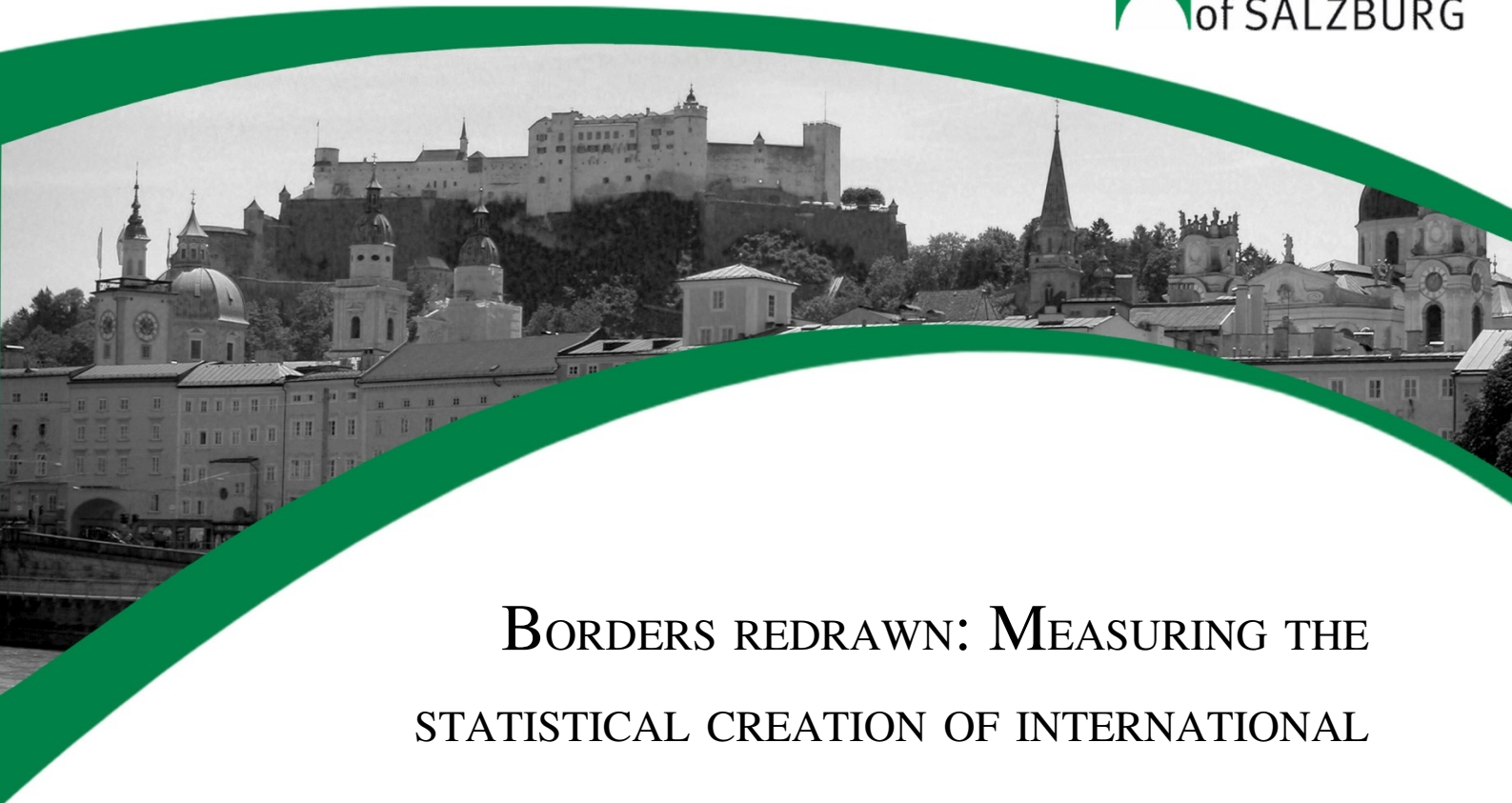
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BORDERS REDRAWN: MEASURING THE
STATISTICAL CREATION OF INTERNATIONAL
TRADE

JESUS CRESPO CUARESMA AND MAX ROSER

WORKING PAPER No. 2011-04

WORKING PAPERS IN
ECONOMICS AND FINANCE

Borders redrawn: Measuring the statistical creation of international trade^{*}

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Max Roser[‡]

Abstract

In this note we quantify how much the of the increase in the volume of international trade that took place since 1945 is due to the reclassification of within-country trade to international trade due to changes in national boundaries. We do so by imposing the territorial delimitations corresponding to 1946 to the current trade flow data, thus quantifying the volume of international trade that would not have been labeled international given national boundaries right after the end of World War II. Our results show that the effect of “boundary redrawing” corresponds roughly to 1% of the total volume of international trade. If colonial trade had been statistically considered to be within-country (within-empire) trade instead of international trade the independence of colonies would have raised this effect to approximately 3% of total trade.

Keywords: International trade, national borders, globalisation

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1 Introduction

When analyzing the increase in world trade since World War II, Krugman (1995) summarizes the explanations for the observed growth in the volume of international trade. Firstly, improvements in technology have allowed for a reduction in transportation costs. A trend towards trade liberalization, on the other hand, is also put forward to explain such a trend in world trade. The third explanation refers to the fact that, to a certain extent, the definition of *international* trade is arbitrary, since whether trade flows are labelled as within-country or international depends on how national boundaries are drawn. Krugman (1995) refers explicitly to this last issue by admitting that it is “*useful to think about world trade by imagining that it were possible to take a given geography of world production and transportation and then draw arbitrary lines on the map called national borders without affecting the underlying economic geography*” (Krugman, 1995, page 339).

While the first two hypotheses have been extensively analysed in the literature, with myriads of theoretical and empirical studies having been published which attempt to measure the effect of technological change and trade policy on global trade trends,¹ and there is no evidence whatsoever, to the knowledge of the authors, about the quantitative effect the changes in national boundaries. In this paper, we fill this gap in the literature by measuring the change in post-1945 world trade which is due to the changes in territorial delimitations of nations. The exercise needed to obtain such a measure is straightforward: we superpose the national boundaries existing in 1946 to current trade flow data and thus estimate the amount of trade which, being international nowadays, would have been labelled as within-country trade with the boundaries in 1946. Our results indicate that, as compared to 1946, roughly 1% of the current total volume of international trade corresponds to changes in national borders.

The paper is organized as follows. In the section 2, we present the results of the exercise of “redrawing borders”. Section 3 summarizes the results and concludes.

2 Redrawing borders

2.1 Measuring international trade in 2006 with borders of 1946

In order to identify the volume of trade that would not have been considered international given the territorial national borders in 1946 we rely on data collected in the *Correlates of War* (COW) project (Barbieri et al. 2008).² The COW project sources and updates territorial change data from Jaroslav et al. (1998) and bilateral trade data from Barbieri et al. (2009), which in turn is based on the IMF’s *Directions of Trade* dataset. Such datasets allow us to carry out the exercise put forward above by superposing the national territorial divisions of 1946 to bilateral trade data flows of the year 2006 and quantifying the current international trade flows which would have taken place within national boundaries in

¹See the authoritative works of Grossman and Helpman (1995) and Feenstra (1995), for example.

²The data are freely available at <http://www.correlatesofwar.org>.

1946. The main aim of this note is thus to obtain the following measure for 2006 data:

$$T = \frac{\sum_{i \in C} \sum_{j \in C} T_{ij}}{\sum_{i \in W} \sum_{j \in W} T_{ij}},$$

where W is the set world countries as of 2006, C is the set of countries which exist as national territorial units in 2006 but did not exist in 1946 and T_{ij} refers to bilateral trade between country i and j .

From the point of view of the volume of international trade, the most important territorial changes that have taken place when comparing 1946 to 2006 and for which bilateral data are available are summarized in Table 1. In addition to those presented in Table 1, three other territorial changes took place in the period that created new national borders and thus international trade. That was the case for Eritrea and Ethiopia, Taiwan and China (notwithstanding the complex international legal status of Taiwan) and Namibia and South Africa. We exclude these territorial changes since, although they are included in Jaroslav et al. (1998), no bilateral trade flow data between the countries involved in the change in borders are available. Our aggregate results should thus be considered as a lower bound to the effect of changes in borders on international trade figures, although the volume of trade relationships which has not been considered in the exercise is potentially very small.

Table 1: Main territorial changes: 1946-2006

| Disintegration of USSR | | Disintegration of Yugoslavia | | Disintegration of Czechoslovakia | |
|---|--------------|---|------------------------|---|----------------|
| Year | Country | Year | Country | Year | Country |
| 1948 | North Korea | 1991 | Croatia | 1993 | Czech Republic |
| 1991 | Armenia | 1991 | Slowenia | 1993 | Slovakia |
| 1991 | Azerbaijan | 1992 | Bosnia and Herzegovina | | |
| 1991 | Belarus | 1993 | Macedonia | | |
| 1991 | Estonia | 2006 | Montenegro | | |
| 1991 | Georgia | | | | |
| 1991 | Kazakhstan | | | | |
| 1991 | Kyrgyzstan | | | | |
| 1991 | Latvia | | | | |
| 1991 | Lithuania | | | | |
| 1991 | Moldova | | | | |
| 1991 | Tajikistan | | | | |
| 1991 | Turkmenistan | | | | |
| 1991 | Ukraine | | | | |
| 1991 | Uzbekistan | | | | |
| Proportion of bilateral trade in world trade (2006) | | Proportion of bilateral trade in world trade (2006) | | Proportion of bilateral trade in world trade (2006) | |
| 0.79% | | 0.05% | | 0.12% | |

Quantitatively, the disintegration of the USSR has contributed most to the “statistical” creation of international trade in the post World War II period. The volume of international trade created by the birth of new national states amounts to 0.79% of total world trade in 2006. The disintegration of Yugoslavia and Czechoslovakia, with a creation of international trade of 0.05% and 0.12%, respectively, contribute significantly less to this

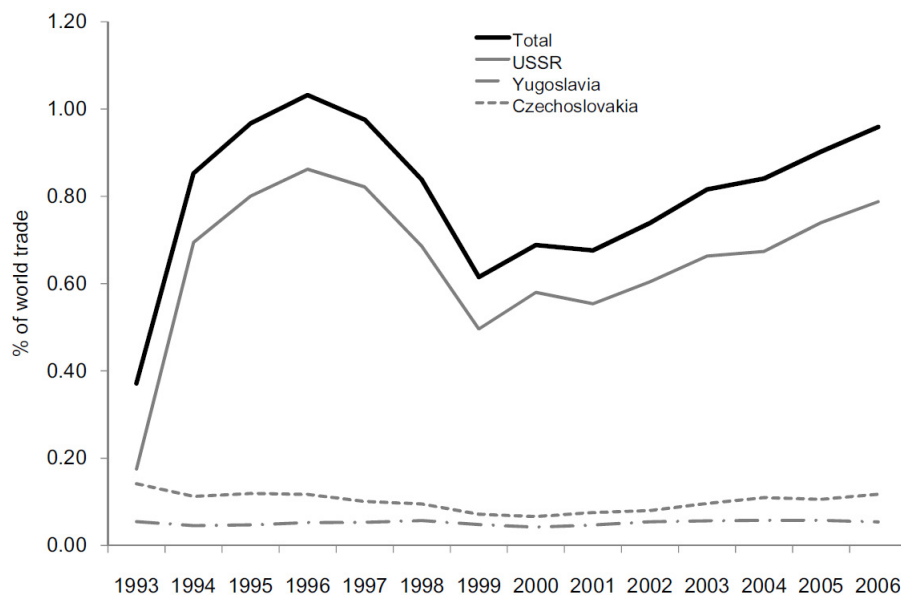


Figure 1: Percentage of world trade created by the disintegration of the USSR, Yugoslavia and Czechoslovakia

effect. The total creation of international trade which is exclusively due to the redrawing of borders since World War II is thus roughly 1% of total world trade in 2006.

Figure 1 shows the size of the effect for data ranging back to the beginning of the 1990s. In spite of the fact that the trade pattern of the new countries born from the disintegration of the USSR tended to be strongly oriented towards the rest of the soviet republics, the relatively low level of overall openness renders the effect small for the first half of the decade. The increase in openness in the mid-nineties, which was not accompanied by a very strong trade reorientation, raised the overall statistical trade creation effect to over 1% of world trade in 1996. The net effect of reorientation and further increases in trade openness is visible in the subsequent ten years, when the overall size of the “borders redrawing” effect in the former USSR³ (and to a quantitatively smaller extent in former Czechoslovakia and Yugoslavia) decreasing first until 1999 and increasing from 1999 until the end of our sample in 2006.

2.2 The case of colonial trade: A thought experiment

At least since the birth of the *Direction of Trade Statistics* and the publication of *Relative Prices of Imports and Exports of Underdeveloped Countries* by the United Nations in 1949, colonial trade has been given the same statistical treatment as international trade in global datasets. From an economic perspective, however, considering that colonial trade is ruled by the same principles as international trade and can be properly understood using trade theory has been explicitly disputed by such personalities as John Stuart Mill, who refers

³See Djankov and Freund (2002a) and Djankov and Freund (2002b) for a thorough analysis of trade patterns within the USSR before, during and after the disintegration process.

to the issue in his classical *Principles of Political Economy*.⁴ Greaves (1954) and Greaves (1957) give sound arguments for considering colonial trade of a different nature from international trade among independent countries. In this subsection we replicate the exercise carried out in the previous subsection assuming that trade between colonies and the colonizing power, as well as among colonies, was categorized as within-country (within-empire) flows. The corresponding changes in boundaries implied by this interpretation, which are driven by the decolonization process, are presented in Table 2 for the most important colonial powers in 1946. We have to add to those colonies included in Table 2 the quantitatively less important effect of the independence of Spanish (Equatorial Guinea), Italian (Somalia) and US (Marshall Islands, Micronesia, Palau) colonies. The total effect of trade creation in the hypothetical case of considering the colonizing empires as individual territorial units would be of roughly 2% of total trade in 2006.

3 Summary and conclusions

We quantify the role played by territorial changes in terms of changes of national borders in the increase of international trade since World War II. This effect, which is purely based on the fact that international trade is defined as the exchange of goods and services across *international* borders, is mentioned in the literature but had not been measured hitherto. By quantifying the volume of bilateral international trade in 2006 which would have been within-country trade in 1946, we conclude total trade would have been 1% lower in 2006 if national borders had remained as in 1946. The size of the effect is mostly determined by the disintegration of the USSR, which contributes 0.79%.

Based on arguments put forward by John Stuart Mill, as a side thought experiment we also compute the size of the effect if colonial trade in 1946 had been considered national instead of international trade. The "border redrawing" effect in this experiment would rise to 3% of total trade in 2006.

⁴See Mill (1909), pages 685-86, as cited by Greaves (1954).

Table 2: Independence of colonies, main colonizers: 1946-2006

| British colonies | | French colonies | | Portuguese colonies | | Dutch colonies | | Belgian colonies | |
|--|-----------------|--|----------------|--|---------------|--|-----------|--|------------|
| Year | Country | Year | Country | Year | Country | Year | Country | Year | Country |
| 1946 | Jordan | 1946 | Libanon | 1974 | Guinea-Bissau | 1949 | Indonesia | 1960 | Congo (DR) |
| 1947 | India | 1946 | Syria | 1975 | Angola | 1975 | Suriname | 1962 | Burundi |
| 1947 | Pakistan | 1953 | Cambodia | 1975 | Cape Verde | | | 1962 | Rwanda |
| 1948 | Israel | 1953 | Laos | 1975 | Mozambique | | | | |
| 1948 | Myanmar | 1954 | Vietnam | 1975 | Sao Tome | | | | |
| 1948 | Sri Lanka | 1954 | Vietnam | 2002 | East Timor | | | | |
| 1949 | Bhutan | 1956 | Morocco | | | | | | |
| 1956 | Sudan | 1956 | Tunisia | | | | | | |
| 1957 | Ghana | 1958 | Guinea | | | | | | |
| 1957 | Malaysia | 1960 | Benin | | | | | | |
| 1960 | Nigeria | 1960 | Burkina Faso | | | | | | |
| 1960 | Cyprus | 1960 | Cameroon | | | | | | |
| 1961 | Kuwait | 1960 | Cent. Af. Rep. | | | | | | |
| 1961 | Sierra Leone | 1960 | Chad | | | | | | |
| 1961 | Tanzania | 1960 | Congo | | | | | | |
| 1962 | Jamaica | 1960 | Gabon | | | | | | |
| 1962 | Trin. and Tob. | 1960 | Ivory Coast | | | | | | |
| 1962 | Uganda | 1960 | Madagascar | | | | | | |
| 1963 | Kenya | 1960 | Mali | | | | | | |
| 1963 | Zanzibar | 1960 | Mauritania | | | | | | |
| 1964 | Malawi | 1960 | Niger | | | | | | |
| 1964 | Malta | 1960 | Senegal | | | | | | |
| 1964 | Zambia | 1960 | Togo | | | | | | |
| 1965 | Gambia | 1962 | Algeria | | | | | | |
| 1965 | Maldives | 1975 | Comoros | | | | | | |
| 1965 | Singapore | 1977 | Djibouti | | | | | | |
| 1966 | Barbados | 1980 | Vanuatu | | | | | | |
| 1966 | Botswana | | | | | | | | |
| 1966 | Guyana | | | | | | | | |
| 1966 | Lesotho | | | | | | | | |
| 1967 | Yemen | | | | | | | | |
| 1968 | Mauritius | | | | | | | | |
| 1968 | Swaziland | | | | | | | | |
| 1970 | Fiji | | | | | | | | |
| 1970 | Tonga | | | | | | | | |
| 1971 | Bahrain | | | | | | | | |
| 1971 | Bangladesh | | | | | | | | |
| 1971 | Qatar | | | | | | | | |
| 1973 | Bahamas | | | | | | | | |
| 1974 | Grenada | | | | | | | | |
| 1976 | Seychelles | | | | | | | | |
| 1978 | Dominica | | | | | | | | |
| 1978 | Solomon Islands | | | | | | | | |
| 1978 | Tuvalu | | | | | | | | |
| 1979 | Kiribati | | | | | | | | |
| 1979 | St. Lucia | | | | | | | | |
| 1979 | St. Vincent | | | | | | | | |
| 1980 | Zimbabwe | | | | | | | | |
| 1981 | Ant. and Barb. | | | | | | | | |
| 1981 | Belize | | | | | | | | |
| 1983 | St. Kitts | | | | | | | | |
| 1984 | Brunei | | | | | | | | |
| Prop. of bil. trade in world trade (2006) | | Prop. of bil. trade in world trade (2006) | | Prop. of bil. trade in world trade (2006) | | Prop. of bil. trade in world trade (2006) | | Prop. of bil. trade in world trade (2006) | |
| 1.47% | | 0.39% | | 0.02% | | 0.03% | | 0.01% | |

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