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# **Economic-base theory and highly-open economies: incorporating day-to-day mobility**

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Philippe Poinot

Assistant professor, Laboratoire Ville Mobilité Transport (LVMT, UMR-T 9403), Ecole des Ponts, IFSTTAR, UPEM, UPE  
Philippe.Poinot@u-pem.fr

Jean-François Ruault

Graduate researcher, Université Grenoble Alpes, Irstea, UR LESSEM  
and Associate researcher, Laboratoire Ville Mobilité Transport (LVMT, UMR-T 9403), Ecole des Ponts, IFSTTAR, UPEM, UPE  
jean-francois.ruault@irstea.fr

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## **Abstract**

Territories (regions, cities, districts...) are considered today to play an important role in economic activities and growth. There is therefore an increasing need for local-level tools to support effective territorial policies. Economic-base theory is a conventional theoretical framework used to describe the main short-term factors of economic development in highly-open economies. While in the mainstream application of this theory only export activities are considered to be basic, in that they generate external income, the literature highlights the importance of day-to-day mobility, the so-called “residential” economy and the “in-place” or “presential” economy, for the development of these kind of economies. This raises questions about two assumptions of traditional economic-base theory: that individuals may use a non-marginal fraction of their income to buy consumer goods and services outside their place of residence; and that the income of an area’s residents may differ from income produced in that area. This paper seeks to explore the theoretical implications of these two fundamental characteristics of highly-open economies.

## Introduction

Economic-base theory is a conventional theoretical framework used to describe the main short-term factors of regional (or local)<sup>1</sup> economic development, with particular relevance to small regions (Aydalot, 1985; Davezies, 2005, 2008; Krikelas, 1992; Schaffer *et al.*, 2004; Thiebout, 1956; Vollet & Dion, 2001). It posits that money inflows from other regions (i.e. external revenues) are the main engines of economic activity at local level. As a result, a distinction is usually made between “basic activities”, which make external incomes possible and therefore underpin the entire growth process, and “non-basic activities”, which are locally provided services that strictly depend for their growth on the level of basic activities. That is why non-basic activities are also viewed as constituents of a multiplier effect on the spending of external income, and have been described by some scholars as “sterile”, “unproductive” or even “parasitic” activities (Williams, 1997).

For a long time in the mainstream use of this theory, only export activities were considered as basic for regional economics, since exported goods and services provided external incomes (Hoyt, 1954; Segessemann & Crevoisier, 2016; Vollet & Dion, 2001). In consequence, local growth was seen as strictly dependent on export performance and the belief was that regional development policies should focus primarily on the interregional competitiveness of export activities. Since the 1990s, however, alternative applications of the theory have extended the definition of basic incomes to various external wage and non-wage sources, increasingly exposing the limitations of the mainstream application. For example, commuters from resident households brings in wages earned outside (Cobbe, 1994; Markusen, 2007; Markusen & Schrock, 2009), and tourists or transient customers feed regional markets through external consumer spending (Bain, 1984; Bourret, 1988; Vollet, 1998, 2013; Dissart & Vollet, 2011; Ruault, 2017a). More broadly, non-wage incomes massively sustain local living standards (Kendall & Pigozzi, 1994; Nesse, 2014) through various public and private transfers, such as social welfare, unemployment insurance, alimony payments, family financial support, and so on. More recent work has been successful in directly comparing the economic of various basic activities (Davezies, 2005, 2008; Segessemann & Crevoisier, 2016) or has highlighted the key importance of supply-side factors for regional development (Vollet *et al.*, 2017), and has thereby finally shown the limited role of exports in regional development. Among the

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<sup>1</sup> In this paper, “regional” and “local” economies will be used as synonyms.

new sources of basic income considered in this work, social welfare and public employment have significant weight, but not as great as both the so-called “residential” economy and the “in-place” or “presential” economy. The residential economy is a major driver, both through incomes earned from outside by commuters and pension income received by people who have retired locally. The in-place economy is another significant basic source of external revenues, supported by external consumer spending by people passing through the locale, such as tourists or transient customers (Ruault, 2017a), more broadly described as “visitors”.

Both the residential and the in-place economies are private mechanisms of wealth transfer that are not usually incorporated into macroeconomic models. This is probably because a large economic region (such as a nation), which encompasses a mass of economic processes, is conventionally judged to be a more appropriate scale than a small area on which to understand and predict economic development. Rather than revising macroeconomic models to reflect smaller-scale regional factors, such factors are simply deemed irrelevant. However, as pointed out by Charles Tiebout (1956), on a global scale there is simply no such thing as export. In other words, bounded economies are analytical constructs that need to be explicitly justified rather than implicitly assumed, an observation that is particularly valid today in light of the weakening, if not evaporation, of economic boundaries. However, economies are commonly depicted as bounded by socio-political limits, sometimes routinely or for convenience, but also more profoundly because an economy is inevitably embedded in some “fixity of form and identity – whether in terms of the boundaries of firms, national states or local spaces” (Hudson, 2005). There are still collective boundaries that divide humankind into multiple communities, in some cases interlinked, but which nevertheless apply a variety of rules of territoriality and set themselves specific economic development objectives and policies. Just as with issues of growth or development affecting national communities, regional issues – even among smaller communities – are a legitimate and relevant object of scientific investigation. Once smaller community and territory specific economies are perceived as relevant, flows of people and money need to be incorporated into macroeconomic models in order to accurately reflect how such highly-open economies work and assess how local communities can develop more effectively. As recently simulated by Hermannsson (2016), there is for example reason to expect that wage and consumption flows matter for small regions, in particular when they are integrated into a larger city-region. This raises questions such as which of the various money inflows should be included in the basic

economic framework, and which mainstream economic assumptions are challenged by small-sized economies.

To the best of our knowledge, little modern research has sought to incorporate these elements into macroeconomic models. Koning *et al.* (2015) offer a first exception, appropriately broadening the range of basic activities, but with two main limitations. First, they focus primarily on the economic impact of high-speed rail, without explicitly examining how their extended view challenges the traditional economic-base model. Second, they consider only additional money inflows brought by visitors and the leakage of money outflows from inhabitants, without differentiating in their theoretical macroeconomic framework between locally-produced incomes, possibly allocated to external earners, and locally-disposable income, which is most likely to be injected back into the local market. This article examines how residential and consumption-based money flows can be fully integrated into the economic-base model. In so doing, it first helps to provide a more accurate understanding of economic development in small-sized economies, where additional basic activities – such as commuter wage inflows – need to be highlighted. Secondly, by building a locally-scaled macroeconomic model (Davezies, 2008), it makes explicit the underlying logic of regional development and illustrates emerging concepts such as the residential or the in-place economy.

This paper is divided into two parts. The first illustrates the significant importance of residential and consumer-based money flows for the development of small regions (*Section 1*). The second derives the theoretical implications of these factors and shows how incorporating extended flows into the macroeconomic model adds new basic activities and new forms of leakage (*Section 2*).

## **1. Two empirical evidences that challenge the traditional economic-base model for highly-open economies**

### *1.1. The traditional economic-base model*

Before discussing two characteristics of highly-open economies, we first present the traditional model of the economic-base theory. As this article only focuses on private transfers of wealth between territories, we assume a small open economy without state and social

protection.<sup>2</sup> This economy, named *i*, produces one good which can be used for consumption as well as investment. Moreover, it operates under full employment, which means first that the demand for goods and services determines the supply of goods, and second that employment depends only on firms demand for labor. Finally, we assume that economy *i* uses the same money as others economies.

This open economy *i* may be represented by the following seven equations:

$$Y_i = Y_i^d \equiv C_i + I_i + X_i - M_i \quad [1]$$

$$C_i = c_i Y_i \quad \text{where } c_i \in ]0,1[ \quad [2]$$

$$I_i = \bar{I}_i \quad [3]$$

$$X_i = \bar{X}_i \quad [4]$$

$$M_i = m_i Y_i \quad \text{where } m_i \in ]0,1[ \quad [5]$$

$$C_i \equiv C^i \quad \text{and} \quad C^i = c^i R^i \quad [6]$$

$$Y_i \equiv R^i \quad [7]$$

Equation [1] is the equilibrium in the goods market of area *i* where  $Y_i$  represents production (or produced-income) in *i* and  $Y_i^d$  represents aggregate demand. Aggregate demand comprises private consumption in *i* ( $C_i$ ) which, in this model, is consumption by the residents of area *i*, private investment ( $I_i$ ), and net exports ( $X_i - M_i$ ).

Equations [2] to [5] are behavioral equations. To simplify, we suppose the Keynesian consumption function without autonomous consumption expenditure (equation [2]). Consumption increases with income produced in *i* ( $Y_i$ ) and  $c_i$  is the marginal (and average) propensity to consume, which is positive but less than one. Private investment is assumed to be determined by exogenous factors (equation [3]).

In this model, the relations between area *i* and other economies concern only imports and exports of goods and services. As in the base economic theory literature, we assume that exports are given, which means that  $X_i = \bar{X}_i$  (equation [4]). Imports (equation [5]) are a linear

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<sup>2</sup> This means that we do not take into account what Davezies (2008) called the public economic base, e.g. the incomes of state employees, and the social economic base, which relates to social income transfers.

function, with no autonomous components, of income produced in area  $i$ , and  $m_i$ , which is positive and smaller than unity, is the marginal (and average) propensity to import.<sup>3</sup>

Lastly, equations [6] and [7] are two assumptions implicit in the basic Keynesian model. The first (equation [6]) assumes that consumption spending in area  $i$  ( $C_i$ ) are more or less equal to the consumption of the residents of  $i$  ( $C^i$ ). This means that individuals buy consumer goods and service where they live. The consumption function of the residents of  $i$  has the same functional form as [2] where  $c^i$  is the propensity to consume of the residents of area  $i$ . Equation [7] states that the income of the residents of  $i$  ( $R^i$ ) is equal to income produced in area  $i$  ( $Y_i$ ). It will be noted that equations [2], [6] and [7] imply that  $c_i = c^i$ .

Taking into account equations [2] to [7], the equilibrium in the goods market of area  $i$  is given by:

$$Y_i = k_i^1 (\bar{I}_i + EB_i^1) \quad [8]$$

where  $k_i^1 = \frac{1}{1 - c^i + m_i}$  and  $EB_i^1 = \bar{X}_i$ .

$k_i^1$  is the Keynesian multiplier for area  $i$ , which is positive.<sup>4</sup> It increases with average propensity to consume ( $c^i = c_i$ ) and decreases with average propensity to import ( $m_i$ ). The only economic base of area  $i$  ( $EB_i^1$ ) is export base ( $\bar{X}_i$ ).

This model assumes that spending by individuals on consumption primarily takes place in their home area (equation [6]) and that the income of the residents of an area is equal to the income produced in that place (equation [7]), two assumptions that are not appropriate in highly-open economies. In the next section, we will start by focusing on the validity of equation [6].

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<sup>3</sup> An alternative to incorporating imports would be to disaggregate imports according to the sources of aggregate demand as Palley (2009) and Charles & al. (2013) did for Nord-Pas de Calais in France. However, this approach seems more relevant when studying the effects of public expenditure, and would complicate our analysis without contributing anything of real value.

<sup>4</sup> Index 1 refers to the case studied (here, case 1 which is the traditional economic-base theory model). We will do the same in Section 2 of this article.

1.2. *From home to places of consumption: the disruptive role of consumer spending flows*

Highly-open economies give rise to various interregional economic flows, useful in sustaining economic activity (export, tourism...) but also – and less commonly recognized – in satisfying basic needs and extending day-to-day opportunities where these are lacking at local level (Claval, 2005). In today's economies, space is sharply divided into separate functional economic zones connected together by transportation technologies that compress both time and space. In addition to permanent migration in search of work or better living conditions, highly-open economies also experience the day-to-day impact of temporary movements for purposes of consumption, resulting in shortfalls in domestic consumption in the place of origin. This is because individuals have needs that can in part be addressed by the consumption of goods and services, which in most cases entails consumer movement. People who live in isolated areas a long way from conurbations probably spend most of their income locally because of a distance-decay effect and the lack of open competition between places of consumption. Today, however, most people live in urban areas with highly competitive retail markets and massive opportunity choices nearby.

Moreover, mass retailing largely targets mobile customers, to the point that people commonly travel significant distances to shop for food or everyday goods. Indeed, in order to manage consumer mobility, some shopping centers actively attempt to keep customers on their premises by providing an extensive range of goods and services, particularly recreational facilities (Teller & Reutterer, 2008). More generally, consumer services are to a large degree concentrated in central locations, where only the largest are able to provide services that are costly and scarce (Berry & Garrison, 1958). Day-to-day urban life is also punctuated by complex trips mediated by transit facilities that enable consumer spending around various locations (lunch near the workplace, shopping near school...), not just from home (Hudson, 2005). Williams (1997) provides numerous examples of attractive consumer services (retail, sport or cultural events...) for external customers. In 1988, in Gateshead in the UK, for example, customers from outside the town accounted for 78% of MetroCentre's retail trade. Herrmann & Beik (1968) similarly related that, in 1965, 71% of Pennsylvanian households surveyed made out-of-town shopping trips. More recent studies similarly observe "cross-border" consumer practices, from national to municipal scale, sometimes associated with a broad definition of tourism (Allen *et al.*, 1993; Leal *et al.*, 2010 ; van der Velde & Spierings, 2011; Bygvrå, 2011; Patel *et al.*, 2015; Ruault, 2017a). In the case of the Paris urban region (Ruault, 2014b), the comprehensive regional transportation survey estimated daily mobility in



2010 at around 14 billion trips a year, at least 22% of them (approximately 3 billion trips) for the purpose of spending, rising to 36% with the exclusion of roundtrips: restaurants, recreation places, regular and occasional shopping destinations.

Such consumer trips are partly internal and partly entail commuting journeys between bounded local economies. Ultimately, one in five contributes to consumer spending outside the home department<sup>5</sup>, a figure that rises to one in two in the case of municipal economies. Shopping outside the home department thus accounts for 552 million consumer trips a year in France and raises the domestic consumption shortfall to 14 billion euros in the departments within the Paris region. Finally, daily mobility generates disruptive money flows between local economies to consider (Hermannsson, 2016), contributing to an absence of consumer services in some areas and concentration in others (Ruault & Proulhac, 2014). Both transportation and food preservation technologies (refrigerators, freezers...) make it routine for today's consumers to undertake longer-distance shopping trips at more widely spaced time intervals. Domestic consumption is inherently vulnerable to day-to-day mobility at the level of community economies.

Another important source of shortfalls in domestic consumption is (overnight stay) tourism. There are numerous opportunities for people to stay in temporary accommodation, whether commercial premises like hotels or B&B, or free lodging with friends and family. In the latter case, tourism may result in only limited out-of-home spending, since food and lodging are free, though situations vary. By contrast, commercial accommodation inevitably entails significant out-of-home consumer spending on items such as tourist tax, accommodation (e.g. renting an apartment), additional luxury (e.g. 5-star hotel standards), meals, etc. In developed societies, both holiday entitlement and free time contribute to massive demand for tourism. Some studies, moreover, have suggested that the concentration of people and wealth in cities itself contributes to rising demand for leisure and tourism activities (Hudson, 2005). The scale of tourism is such that overall it generates 2 billion days of absence from French departments, with the missing inhabitants of one department flooding into others, or possibly into foreign countries (Potier *et al.*, 2007). In 2004, for example, Parisians spent an average of 43 days a year away from their home-city. According to Lejoux (2006), French regions mutually

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<sup>5</sup> In the administrative divisions of France, the department (French: *département*) is one of the three common levels of government below the national level, between the administrative regions and the municipalities.

exchange at least 53 billion euros a year in tourist spending,<sup>6</sup> bearing in mind that the French currently spend an annual 25 billion euros abroad.

This general observation therefore undermines the assumption that final demand is satisfied either by domestic production or by imports. People are not captive within their home areas but mobile consumers who regularly spend money in other regions. Regional economies – particularly smaller economies – are consequently affected – whether positively or negatively – by the balance in their consumer spending flows with the rest of the world, which we will subsequently refer to here as the “visitor consumption balance”.

### 1.3. *From home to workplace: the disruptive role of wage income flows*

Section 1.1 recalls a common assumption of standard macroeconomic models that total locally-disposable household income is equal to locally-produced income, i.e.  $R^i \equiv Y_i$ . On this assumption, the chief and sole driver of locally-disposable household income is local production, an assumption that is severely deficient with respect to regional economies and even perhaps to some nations. For example, France – with a surface area of 643,801 km<sup>2</sup> – has near 67 million inhabitants who shared – according to the national accounts – national income of around 1,702 billion euros in 2010, more than 15% of which came from foreign sources. This proportion is undoubtedly higher for small countries and even more so for subnational communities. Moreover, while communities can be the beneficiaries of foreign income, locally generated income can also flow outwards (Hazans, 2004; Davezies, 2008; Segessemann & Crevoisier, 2015; Ruault, 2017b; Vollet *et al.*, 2017).

Government and social transfers excluded, two major income flows help to differentiate between disposable and locally generated income. First, when regions are retirement destinations, they benefit from pension and annuity incomes earned by their new populations from other contributing communities, and particularly from the former regions of residence. Second, locally produced income is shared between domestic and external owners of factors of production. It is not hard to imagine that owners of land and capital may live outside the region where their factors of production are used.

In recent decades, population concentration in urban areas has also brought spectacular growth in house prices as well as new demand for land and transportation systems. Globalization in particular is a shaping force for urban concentration and competitive

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<sup>6</sup> Lejoux recognised that she underestimated the phenomenon because of a restrictive definition of tourist spending (*e.g.* excluding transportation or anticipated expenditures) as a result of a deficiency of data.

production centers. This partly explains the emergence of city regions (Scott, 2002), cities that expand into their surrounding areas, increasing the distances between their different parts and urban economic functions. As transportation technologies have improved in city regions (mass transit systems, private car ownership, infrastructure performance...), daily commuting distances have become longer, connecting attractive and/or affordable residential areas with workplaces, regardless of administrative boundaries (Hudson, 2005). This phenomenon in turn drives urban sprawl and forces historical local authorities to become extensively involved in urban and regional governance (Salet & Kreukels, 2003; Jonas & Ward, 2007). In 2004, for example, the average commuting distance in France was 26 kilometers, with the result that three out of four employees at the time were working outside their home municipality, rising to 80% for suburban and nearly 90% for rural municipalities (Davezies & Talandier, 2014).

In the Paris region, according to the last available transportation survey, commuting accounted in 2010 for around 29% of daily trips and for 41% of transit time, for an average trip distance of 19 kilometers. There were also significant variations between subregional communities, with only 32% of active commuters in Paris and 56% in les Hauts-de-Seine, for example. A significant proportion of jobs in the Paris region jobs were ultimately held by non-resident employees (*Ibid*). By way of example, Table 1 shows that – as of 2010 – at least 41% of the locally disposable wage-income for inhabitants of subregional Parisian areas depended on externally generated income.

Area of residence	Disposable wage-income (€ billions)		% of externally produced income
	Locally produced	Externally produced	
Paris	10.3	7.2	41%
Seine-et-Marne	3.7	3.9	51%
Yvelines	4.6	5.5	54%
Esonne	3.6	4.1	54%
Hauts-de-Seine	5.6	6.6	54%
Seine-Saint-Denis	2.5	4.6	65%
Val-de-Marne	2.7	5.3	66%
Val-d'Oise	2.5	4.2	63%

*Source: Author's calculation from the 2010 DADS database*

Table 1: The significance of externally produced wage-income for disposable income in the Paris Region (2010)

Even more significantly, externally produced wage-income is the main component of disposable income for seven of the eight areas of residence (from 51% for Seine-et-Marne to

66% for Val-de-Marne). Commuting trips thus play a major role here in income redistribution.

Existing studies have already pointed out the disruptive impact of commuting on regional development (Greenhut, 1959; Garrison, 1972; Davezies, 2008; Talandiesr & Davezies, 2009; Ruault, 2014b; Segessman & Crevoisier, 2016; Hermannsson, 2016). Other research also records the significant importance of externally produced income for locally disposable income when residential regions host landowners, private investors or retirees (Forward, 1982; Hirschl & Summers, 1982; Hodge, 1991; Kendall & Pigozzi, 1994; Nelson, 1997, 1998; Vollet *et al.*, 2005; Davezies, 2010; Nesse, 2014). For example, reporting on French commuting zones, Laurent Davezies (2010) notes that the contribution from commuting wage-income flows to local disposable income in 2006 ranged from 1% (Briançon) to 40% (Altkirch), reflecting the difference between rural or mountain areas and frontier or suburban zones. He also estimates the contribution of pension income in commuting zones at between 10% (Briançon) and 60% (Calvi-Ile Rouse). More recently, Nesse (2014) has made similar observations regarding U.S. commuting zones, where non-wage incomes account for 43% of all disposable income, rising to 52% in nonmetropolitan areas. In the end, the failure to differentiate between locally disposable and locally produced income proves misleading in the quest for an accurate understanding of regional economies.

In fact, both public and private transfers of wage and non-wage income affect the disposable income of inhabitants to such an extent that they should be included by default in regional macroeconomic models and in the calculation of income multiplier effects.

## **2. New leakages and the emergence of two new economic bases (visitor and residential economic bases)**

### *2.1. When consumers spend their income outside their home areas: the emergence of the visitor economic base*

The objective of this section is to derive the theoretical implications for economic-base theory from the two pieces of empirical evidence set out in Sections 1.2 and 1.3, which cast doubt on the validity of equations [6] and [7]. In this section, we focus on what changes when individuals have the ability to move and spend their income outside their home areas. The

ability of individuals to spend their income outside their home areas invalidates equation [6], since consumer expenditure in area i ( $C_i$ ) might not be the same as consumer expenditure by the residents of i ( $C^i$ ), as can be seen in Table 2.

		Home and workplaces		Totals
		i	j	
Place of consumption	i	$C_i^i$	$C_i^j$	$C_i$
	j	$C_j^i$	$C_j^j$	$C_j$
Totals		$C^i$	$C^j$	

Table 2: Consumer spending in area i and j and consumption expenditures of the residents of i and j

From Table 2, we see that consumption expenditures in area i are given by:

$$C_i = C_i^i + C_i^j = C^i - C_j^i + C_i^j \quad [9]$$

In other words, consumption expenditure in area i is equal to consumer spending in area i by the residents of i ( $C_i^i$ ) and by residents of others economies, which for the sake of simplicity we call j ( $C_i^j$ ). And  $C_i^i$  is total consumption expenditure by the residents of i ( $C^i$ ) minus their expenditure in area j ( $C_j^i$ ). This expenditure is not the same as imports: these goods and services are consumed by the residents of i in area j, whereas imports are goods produced in j but consumed by the residents of i in i. In addition, though perhaps marginal in reality, it is in theory possible that a resident of area i might buy goods and services in j which have been produced in i.

Equations [10] to [12] describe the behavior of each component of consumer spending in area i:

$$C^i = c^i R^i \equiv c^i Y_i \quad \text{where } c^i \in ]0,1[ \quad [10]$$

$$C_j^i = c_j^i R^i \equiv c_j^i Y_i \quad \text{where } c_j^i \in [0, c^i] \quad [11]$$

$$C_i^j = c_i^j R^j \equiv c_i^j \bar{Y}_j \quad \text{where } c_i^j \in [0, c^j] \quad [12]$$

Equation [10] is the consumption function for the residents of area i. It differs from equation [2] only insofar as the marginal (and average) propensity to consume of the residents of i ( $c^i$ )

is now different from  $c_i$ , the marginal (and average) propensity to consume in area i. In addition to  $c^i$ , the latter depends both on the propensity of the residents of area i to consume in area j ( $c_j^i$ ) and of the residents of j to consume in area i ( $c_i^j$ ).

To simplify, we assume (equations [11] and [12]) that consumer spending in j (in area i for equation [12]) by the residents of area i (area j) only increases with the income of the residents of i (residents of j). As Koning *et al.* (2015, p. 50) have asserted, the assumption that outside consumer spending depend on residents' income may be justified because "wealthier households undertake more tourist activities". The marginal (and average) propensities to consume outside the home area ( $c_j^i$  and  $c_i^j$  for the residents of area i and j) are positive and may not be more than the marginal (and average) propensities to consume ( $c^i$  for the residents of i and  $c^j$  for the residents of j). This implies that individuals might use all their income to buy goods outside their home area. In [10], [11] and [12], the incomes of the residents of i ( $R^i$ ) and j ( $R^j$ ) are respectively equal to income produced in area i ( $Y_i$ ) and j ( $\bar{Y}_j$ ), since equation [7] is still assumed to be valid. Moreover, as area i is supposed to be a small economy, its economic activity has little impact on the production of area j, which implies that  $\bar{Y}_j$  is given.

Taking into account equations [9], [10], [11] and [12], the equilibrium in the goods market of area i (equation [1]) becomes:

$$Y_i = k_i^2 (\bar{I}_i + EB_i^2) \quad [13]$$

where  $k_i^2 = \frac{1}{1 - c_i^i + m_i}$  and  $EB_i^2 = \bar{X}_i + c_i^j \bar{Y}_j = \bar{X}_i + C_i^j$ .

$k_i^2$  is the new Keynesian multiplier and  $c_i^i = c^i - c_j^i$  is the marginal (and average) propensity of the residents of area i to consume goods in area i (whether or not the goods are imported). Area i's economic bases now consist of the export base ( $\bar{X}_i$ ) and what we will call the "visitor base" ( $c_i^j \bar{Y}_j = C_i^j$ ), which is consumer spending by visitors to i, in other words residents of j (tourists, transients...). Since the multiplier is the same for the export base and the visitor base, the entry of one euro, whatever the source of this inflow, will have the same effect on the current output of i. On the other hand, employment effects will be differentiated

according to labour productivity: the greater the productivity, the less important the effects on employment.

With regard to [8], the fact that individuals may spend their income away from their home area and workplace prompts two kinds of change: the first concerns the value of the Keynesian multiplier; the second, the economic bases.

First, the Keynesian multiplier ( $k_i^2$ ) depends on the propensities of the residents of  $i$  to consume ( $c^i$ ) and to import ( $m_i$ ), but also on where they do their consuming ( $c_j^i$ ), which constitutes a new leak. In other words, it depends on the marginal (and average) propensity of the residents of area  $i$  to consume goods in area  $i$  ( $c_i^i$ ). This implies that  $k_i^2 \leq k_i^1$ .

The second change is the emergence of a new economic base, the visitor base, which is determined by different factors than the export base. While the latter depends on the area's capacity to export goods abroad ( $\overline{X}_i$ ), the visitor economic base changes according to the territory's ability to attract visitors ( $c_i^j$ ). And this implies that  $EB_i^2 \geq EB_i^1$ .

Thus, even though the Keynesian multiplier is lower, the inflow of money is greater than in Section 1.1. Ultimately and all other things being equal, the economic situation of area  $i$  is better than in Section 1.1 if and only if the visitor consumption balance in Section 1.2 ( $C_i^j - C_j^i$ ) is positive, in other words if consumer spending in area  $i$  by residents of area  $j$  is higher than consumer spending by residents of area  $i$  in area  $j$ .

In addition to the ability of individuals to spend their income outside their home area, we see in Section 1 that there may be a significant difference for small economies between the income of the residents of an area and income produced in that place, which calls into question equation [7]. We will now focus on the implications of this challenge.

## 2.2. *Discrepancy between residents' income and produced-income: the emergence of residential economic base*

In a highly-open economy, a distinction needs to be made between the disposable-income of the residents of area  $i$  ( $R^i$ ) and the income produced in  $i$  ( $Y_i$ ), as can be seen in Table 3.

		Place of production		Residents' income
		i	j	
Home area	i	$R^{i,i} = \alpha Y_i$	$R^{i,j} = \beta \bar{Y}_j$	$R^i$
	j	$R^{j,i} = (1-\alpha)Y_i$	$R^{j,j} = (1-\beta)\bar{Y}_j$	$R^j$
Produced-income		$Y_i$	$\bar{Y}_j$	

Table 3: Income produced in area i and j and income of the residents of i and j

Table 3 gives the following two equations for the income of the residents of i and j:

$$R^i = R^{i,i} + R^{i,j} = \alpha Y_i + (1-\beta)\bar{Y}_j \quad \text{where } \alpha, \beta \in [0,1] \quad [14]$$

$$R^j = R^{j,i} + R^{j,j} = (1-\alpha)Y_i + \beta \bar{Y}_j \quad [15]$$

Equation [14] states that the disposable income of the residents of area i is the sum of the income produced in i that is distributed to the residents of i ( $R^{i,i}$ ), and the income produced in j, i.e. by residents of i working in area j ( $R^{i,j}$ ). The income of the former is a proportion,  $\alpha$ , of income produced in area i, whereas the latter earn a proportion  $(1-\beta)$  of the income produced in j. Equation [15] is the income of the residents of area j: it is a proportion  $(1-\alpha)$  of income produced in i and a proportion  $\beta$  of income produced in j.  $\alpha$  and  $\beta$  depend on the number of individuals working outside their home area, their qualifications, their sectors of activity, the number of individuals holding shares in companies that produce outside their home area, etc.

Both equations ([14] and [15]) have implications for the import function (equation [5]) as well as for consumption functions ([10], [11] and [12]). First, with no loss of generality, we suppose that imports in area i depend only on income produced in i ( $Y_i$ ). Second, assuming for simplicity that all residents of area i, whatever their workplace, have the same propensity to consume,<sup>7</sup> and the same for the residents of area j, then the consumption functions become:

$$C^i = C^{i,i} + C^{i,j} = c^i (R^{i,i} + R^{i,j}) \quad [16]$$

$$C_j^i = C_j^{i,i} + C_j^{i,j} = c_j^i (R^{i,i} + R^{i,j}) \quad \text{where } c_j^i \in [0, c^i] \quad [17]$$

<sup>7</sup> This means that  $c^{i,i} = c^{i,j} = c^i$ ,  $c_j^{i,i} = c_j^{i,j} = c_j^i$  and  $c_i^{j,i} = c_i^{j,j} = c_i^j$ .



$$C_i^j = C_i^{j,i} + C_i^{j,j} = c_i^j (R^{j,i} + R^{j,j}) \quad \text{where } c_i^j \in [0, c^j] \quad [18]$$

Using [16], [17], and [18], the equilibrium in the goods market is:

$$Y_i = k_i^3 (\bar{I}_i + EB_i^3) \quad [19]$$

where  $k_i^3 = \frac{1}{1 - \alpha c_i^i + m_i - (1 - \alpha) c_i^j}$

and  $EB_i^3 = \bar{X}_i + \beta c_i^j \bar{Y}_j + (1 - \beta) c_i^i \bar{Y}_j = \bar{X}_i + C_i^{j,j} + C_i^{i,j}$ .

$k_i^3$  is the new Keynesian multiplier for both local investment and the economic bases, which are composed of export base ( $\bar{X}_i$ ), visitor base ( $\beta c_i^j \bar{Y}_j = C_i^{j,j}$ ), and what may be termed the residential economic base ( $(1 - \beta) c_i^i \bar{Y}_j = C_i^{i,j}$ ). The latter corresponds to consumer spending by commuters in area i, pensions received by pensioners resident in area i, family financial aid for students who live in i...

Compared to [8] and [13], the difference between the income produced in an area and the income of the residents of that area has an impact on the Keynesian multiplier and the economic bases. Regarding the multiplier, three changes should be noted.

First, and as set out in the previous sections, the multiplier depends only on income produced in area i. However, as this income may now be held by both residents of i ( $R^{i,i}$ ) and residents of j ( $R^{j,i}$ ), the multiplier depends on the consumption behavior of these two sets of individuals. Indeed, its value increases, on the one hand, with  $\alpha c_i^i$  which is the proportion distributed to the residents of i of an euro produced in area i and spent by them on purchasing consumer goods in area i and, on the other hand, with the part of an euro produced in area i that is distributed to the residents of j ( $1 - \alpha$ ) and which returns to area i through visitor spending ( $c_i^j$ ). A higher propensity to consume goods and services from area i by residents of j who, for instance, work in area i, will thus increase the value of the multiplier.

Second, the parameter  $\alpha$  – the share of income produced in area i that is distributed to the residents of i – has an ambiguous effect on the value of the Keynesian multiplier. In particular, two counteracting effects can be noted. On the one hand, *ceteris paribus* an increase in  $\alpha$  increases the income of the residents of i who, for instance, work in i ( $R^{i,i}$ ), and

hence consumption in area i by residents of i ( $C_i^i = c_i^i R^i$ ). On the other hand, it decreases the income of the residents of j who work in i, and hence their consumption expenditure in i ( $C_i^j$ ). *In fine*, an increase in  $\alpha$  will have a positive effect on the value of the multiplier if and only if the former effect outweighs the latter, i.e. when  $c_i^i > c_i^j$ .

Third, the multiplier may be higher as well as lower than  $k_i^1$  (Section 1.1) and  $k_i^2$  (Section 2.1) depending on the value of the various parameters. In particular, it is higher than  $k_i^1$  when  $(1 - \alpha)c_i^j > c_i^i - \alpha c_i^i$  and higher than  $k_i^2$  if  $c_i^i < c_i^j$ .

Regarding the economic bases of area i, equations [14] and [15] imply the emergence of a residential economic base which is the consumption expenditure of residents of area i who are financially independent of income produced in i, for example who work in area j ( $C_i^{i,j}$ ). It increases with both the proportion of income produced in j distributed to the residents of i ( $1 - \beta$ ) and the propensity of the latter to consume in area i ( $c_i^i$ ).

It should be noted that parameter  $\beta$  – the proportion of income produced in j that is distributed to the residents of j – has an ambiguous effect on the economic bases of area i ( $EB_i^3$ ). All things being equal, an increase in  $\beta$  raises visitor base ( $\beta c_i^j \bar{Y}_j$ ) but decreases residential base ( $(1 - \beta)c_i^i \bar{Y}_j$ ), which means that it will reduce the economic bases of area i if the propensity of residents of i to consume in area i is higher than that of the residents of j to do so ( $c_i^i > c_i^j$ ).

In terms of economic bases ( $EB_i^3$ ), we see that the ways in which the production of area j ( $\bar{Y}_j$ ) may influence income produced in i ( $Y_i$ ) are much more varied than in previous cases.

On the one hand, an increase in  $\bar{Y}_j$  will, *ceteris paribus*, increase the income of the residents of i ( $R^{i,j}$ ), hence their consumer spending and the residential economic base of area i ( $C_i^{i,j}$ ).

On the other hand, it will increase the income of the residents of j ( $R^{j,j}$ ) and the latter's visitor base ( $C_i^{j,j}$ ).

So while the Keynesian multiplier may be either higher or lower than in the previous cases, the economic bases are higher ( $EB_i^3 > EB_i^2 \geq EB_i^1$ ).<sup>8</sup> The economic situation of area i is better

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<sup>8</sup> The only condition is that  $c_i^{i,j}$  or  $c_i^{j,j}$  are positive, which is more than likely.

than suggested by the previous section (Section 2.1), when what might be termed the “residential consumption balance” ( $C_i^{i,j} - C_j^{j,i}$ ) more than offsets the saving on the proportion of income produced in  $i$  that is distributed to the residents of  $j$ , i.e. if  $C_i^{i,j} - C_j^{j,i} > R^{j,i} - C^{j,i}$ . Compared to Section 1.1, it is better if  $(C_i^{j,j} - C_j^{i,i}) + (C_i^{i,j} - C_j^{j,i}) > R^{j,i} - C^{j,i}$ , which means that the visitor consumption balance and the residential consumption balance are higher than the amount saved by the residents of  $j$ .

## Conclusion

Territories (regions, cities, districts...) have perhaps never enjoyed as much legitimacy and confidence as they do today. They have simultaneously become a favored transmission belt for national policies on various priorities (growth, sustainable development, transportation, housing...), a powerful level of public decision-making (e.g. the sanctuary city movement in the USA), a major influence on development models (e.g. mass transit in Curitiba, Brazil), and key factors of economic growth (cf. NEG). There is consequently an increasing need for tools at local level, even at the smallest scale, to support efficient territorial policies. Economic-base theory provides an interesting theoretical framework through which to understand regional development from a macroeconomic point of view; however, there needs to be much greater recognition of the impact of day-to-day mobility as a major disruptive factor than is currently the case.

This paper seeks to derive the theoretical implications of two fundamental characteristics of highly-open economies that challenge traditional economic-base theory. The first characteristic is that individuals may use a non-marginal portion of their income to buy consumption goods and services outside their home area. The second is that the income of the residents of an area cannot be considered equal to income produced in that area. Our results are summarized in Table 4.

<b>Economic sphere</b>	<b>Economic base</b>	<b>Income leakage (Keynesian multiplier)</b>	<b>Balance</b>
Productive	$\bar{X}_i$	$M_i$	$\bar{X}_i - M_i$
Visitor	$C_i^{j,j}$	$C_j^{i,i}$	$C_i^{j,j} - C_j^{i,i}$
Residential	$C_i^{i,j}$	$C_j^{j,i}$	$C_i^{i,j} - C_j^{j,i}$

<i>Totals</i>	$\bar{X}_i + C_i^{j,j} + C_i^{i,j}$	$M_i + C_j^{i,i} + C_j^{j,i}$	$(\bar{X}_i - M_i) + (C_i^{j,j} - C_j^{i,i}) + (C_i^{i,j} - C_j^{j,i})$
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Table 4: Economic bases and income leakage in a highly-open economy

These two distinct characteristics of small-sized economies entail at least three changes. First, each characteristic creates a new economic base. In particular, we show that the visitor base ( $C_i^{j,j}$ ) derives from the first characteristic, whereas the residential base ( $C_i^{i,j}$ ) is the outcome of the second. Second, they are a source of new income leakage,  $C_j^{i,i}$  and  $C_j^{j,i}$ , which would have the effect of reducing or increasing the Keynesian production multiplier. Third and finally, besides the productive or commercial balance that is a common feature of open economies, economic exchanges in highly-open economies are also characterized by two other balances that are related to the consumption of individuals: the visitor consumption balance and the residential consumption balance.

Incorporating these factors increases the relevance of economic-base theory to the study of highly-open economies. However, some limitations still remain. Firstly, economic behaviors are much more complex than those considered here, for example including consumption functions. Secondly, some parameters are assumed to be independent, although this is still uncertain. For example, if conflicting consumer behaviors are observed between visitors and inhabitants, then  $C_j^i$  and  $C_i^j$  should not be considered independent, which has an impact on the economic bases as well as the Keynesian multiplier of a territory. It would therefore be useful to conduct further research to test such assumptions empirically. Thirdly, this improved analytical framework is only useful in describing how regional economies currently work, and does little to permit robust predictions. Its focus is exclusively short-term, and it has little to say about long-term income, capital accumulation, and local economic resilience or capabilities.

With this in mind, economic-base theory still provides a powerful tool for identifying short-term local development factors, regional specificities, and ultimately helping to shape development policies. The original contribution of this paper is to open up perspectives for further research on economic-base theory. For example, in the future other basic forms of income could be incorporated into the current model, such as state-supported income, social welfare benefits, current private transfers between people, or even the contribution of local taxation policies to the income multiplier. Finally, this paper shows the need for economic-

base theory to be further formalized in order to take account of the properties of highly-open economies.

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