



## **Wealth Creation in Rural Communities**

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**An Exploratory Study of  
Economic Flows in Two  
Natural Resource-Rich  
Regions**

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State University

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This report is part of the Wealth Creation in Rural America initiative, funded by the Ford Foundation. The aim of the initiative is to help low-wealth rural areas overcome their isolation and integrate into regional economies in ways that increase their ownership and influence over various kinds of wealth. The initiative has produced nine previous papers, which can be found at <http://www.yellowwood.org/wealthcreation.aspx>. The goal of this report is to advance the initiative's broad aim of creating a comprehensive framework of community ownership and wealth control models that enhance the social, ecological, and economic well-being of rural areas.

## Author Organizations

The goal of the **Rural Studies Program at Oregon State University** is to improve environmental, economic, social and cultural well-being in Oregon's rural communities by establishing the premier program for rural community sustainability in the Land Grant University system. The Rural Studies Program focuses research and outreach in four areas: rural economies, rural environments and natural resources, rural policy, and rural society.

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## Wealth Creation In Rural Communities

# **Wealth Creation and Rural-Urban Linkages: An Exploratory Study of Economic Flows in Two Natural-Resource-Rich Regions**

**Bruce Weber and Mallory Rahe<sup>1</sup>**

In recent years, those concerned about reducing poverty in regions with a history of persistent poverty have increasingly focused attention on the importance of wealth creation. Increases in wealth are seen as key components of a strategy of poverty reduction. This discussion has emphasized both individual assets and community assets, and has conceived wealth broadly to include economic, social and environmental assets. In this paper, while recognizing the critical importance of social and environmental assets and of individual decisions that determine wealth generation, we focus on the economic dimension of wealth creation and on the aggregate changes in wealth in a region rather than individual changes in wealth.

The creation of wealth in rural America requires investment in productive assets owned by local residents and businesses. The economic flows underlying this investment are very difficult to track given our current regional accounting systems. The goal of this paper is to lay out a framework for understanding the most important of these economic flows and to apply it to a preliminary analysis of economic linkages across a hierarchically organized set of urban core and rural periphery regions in two natural-resource-rich U.S. regions: the Pacific Northwest and Appalachia. We explore four BEA Economic Areas in the states of Oregon and Washington in the Pacific Northwest, and five economic areas in Central Appalachia.

The two distinctive elements of this study are (1) its focus on rural places as part of a larger interdependent system of central urban cores and relatively rural peripheries and (2) its focus on changes in regional current account surpluses (and deficits) as potential sources of funds to increase (or decrease) a region's wealth. The paper is divided into five parts: (1) a discussion of the two conceptual underpinnings of the study: (a) the regional economic geography framework in which places are organized into hierarchically arranged regions comprised of urban cores and relatively rural hinterlands or peripheries; and (b) the accounting framework within which wealth creation will be explored; (2) a description of the particular regionalization scheme underlying the analysis – the BEA-designated economic areas – and an economic description of the nine regions focusing on their major exports; (3) an examination of the trade flows across cores and peripheries and between regions, leading to estimates of trade surpluses or deficits in each region; (4) an estimate of the current account balance (surplus or deficit) of each region and each core and periphery

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taking into account both net trade flows and other major economic flows not related to trade (transfer payments, federal taxes and dividends, interest and rent); and (5) a summary of our findings on wealth creation potential in Oregon and Appalachia.

### ***Economic Regions as Interdependent Systems of Urban Cores and Rural Peripheries***

Economic regions are spatially organized into urban cores surrounded by rural peripheries that contain smaller communities and open relatively undeveloped land.<sup>2</sup> These regions are organized hierarchically. Large cities offer a very wide range of goods and services. Smaller cities offer a more limited range of services and depend on the large urban core cities for specialized goods and services. Natural-resource-dependent economic activities such as farming, ranching, forestry, mining and fishing depend on the existence of particular natural resources and sell their production in order to be able to buy the goods and services available in small communities and urban cores.

The economic activity and trajectory of any particular place depends on two fundamental economic realities: its comparative advantage and its place in the urban hierarchy.

A place's comparative advantage depends on its productivity in various goods and services. The comparative advantage is based on the constellation of assets of a region, including its physical, natural, human, natural, and social capital. It is often possible to discern a region's comparative advantage by looking at the types of goods and services it exports.

The urban hierarchy develops because different goods and services have different sized market areas. The size of the market area depends on the travel costs, per capita demand, population density and scale economies. Specialized legal services, for example, have large market areas because travel costs are not important, per capita demand is low and thus high population densities are needed. Gas stations, for another example, have small market areas because transport costs are important, per capita demand is high so dense populations are not needed and there are few scale economies. According to central place theory, economic activity organizes over space so that there is a small number of large cities (*urban cores*) that specialize in goods and services that require a large market area (such as specialized legal and business services) and a relatively *rural periphery* comprised of (a) a large number of smaller cities specializing in goods and services that have small market areas (such as convenience stores and gas stations) and (b) sparsely settled populations engaged in activities such as farming and forestry that require particular natural resources and large tracts of unpopulated land. Goods and services with small market areas will be found in both small communities and large cities.

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<sup>2</sup> Cities develop because differences in productivity across space lead each area to have a comparative advantage in the production of certain goods and services, and because the existence of scale economies and agglomeration economies make it economical to concentrate production of certain goods and services in densely populated areas. The discussion of urban and regional economic concepts in this paper draws heavily on the first edition of Arthur Sullivan's *Urban Economics* (Homewood IL: Irwin, 1990)

The wealth creation potential of each region is expected to depend on (1) the comparative advantage of each region's core and periphery as discerned through its exports, (2) the size of the urban core in each region; (3) the extent and nature of interdependence between core and periphery; and (4) the extent and nature of economic interdependence across the urban hierarchy in each major region (Central Appalachia and Oregon).

### ***An Accounting Framework for Understanding Regional Economic Flows and Wealth Creation Potential***

The wealth of a community includes many different kinds of assets. Many social scientists will describe the wealth of a place in terms of its stock of various forms of capital: social, human, financial, natural capital and so forth. Ratner (2009), for example, identifies six community assets to describe community wealth: intellectual, individual, social, natural, built and financial assets. In this paper, we will deal with only the three types of assets that are most easily valued in monetary terms: natural (especially land), built (real) and financial. These are the constructs underlying the original economic concept of capital, and together they comprise what many people term "wealth". (The "wealthy" have a lot of land, financial assets and/or real assets.)

A region's wealth is difficult to quantify both because data are simply not available on many assets (or if available nationally not reported for small regions) and because of two conceptual problems. The first conceptual difficulty is that real and financial assets are related in ways that can lead to double-counting of assets in a region. The other problem is that the conceptual link in regional economic accounting between the relatively easy-to-measure net trade flows (a major determinant of funds available for wealth creation) and changes in real or financial assets is not as clear as some have argued.

Relative to the first problem, land and real assets are often purchased by one person or firm with loans that become financial assets owned by another person or firm. Before the loans are paid off, the land and real capital are owned conditionally by the purchaser. However, the financial asset that permitted the purchase of the land or real asset is also owned by the lender. When these loans are paid off, the financial asset expires and is no longer a part of the region's financial wealth. Until that time, however, the real asset is part of the region's capital stock and contributes as a factor of production to the region's goods and services. And until that time, the financial asset is part of some region's financial wealth. If the owners of both the real and financial assets are residents of the region, there is some double-counting if one counts both the real and the financial asset in the region's total wealth. Accounts are not kept in ways that link a region's financial assets and real assets.

Economists have tried to overcome lack of region-specific data on assets by looking for links between asset creation and other regional economic measures on which data are readily available. Economic data on flows, particularly trade flows (exports and imports between regions) are much more readily available than data on assets. Regional economists have a conceptual and accounting framework in which regional investment is related to net trade flows.

The relationship between net trade flows and financial wealth accumulation seems relatively straight-forward. Kilkenny and Partridge summarize the relationship succinctly: “There is a net outflow of savings when the value of exports from a region exceeds the value of imports, and an inflow of loanable funds into net importing regions.” (2008, p. 5)<sup>3</sup> Financial wealth increases when a region’s firms and households and governments make loans to other regions, when there is an outflow of savings. An increase in financial wealth can be inferred when exports of goods and services from a region exceed imports of goods and services, other things equal. That is, in the absence of offsetting flows, when region i has a positive trade balance, that region must be lending money to other regions (thereby accumulating financial assets) so that the other regions can finance their excess imports of products and services. By this logic, financial wealth in region i must be increasing.

Conversely, in the absence of offsetting flows, when region i has a negative trade balance, it must be borrowing money from other regions or drawing down savings. Offsetting flows that might allow region j to finance the excess imports would be the drawdown of savings or retained earnings or budget surpluses by the region’s firms, households or governments, or receipt of loans or transfers from other regions or from the federal government. That is, by this logic, financial wealth in that region must be decreasing, absent offsetting flows.

The relationship between exports and imports (net trade flows) and real investment (leading to real wealth creation) is less clear. Real wealth increases when a region’s firms and households and governments make real investments in their regions.<sup>4</sup> A negative trade balance means that a region is borrowing from other regions. What is contested is the extent to which one can assume that borrowing is dedicated to real investment. There is a long-standing tradition in regional science – and one of the bases for Kilkenny and Partridge’s critique of export base theory – that assumes that a negative net trade balance implies capital investment, which would increase a region’s real wealth. (See, for example, Kilkenny and Partridge, 2008, 2009) In the absence of offsetting flows, this argument goes, when region i has a negative trade balance, the region must be borrowing from other regions and accumulating real assets. Hoover and Giarratani (1984), for example, argue:

If a region’s earnings from exports exceed its outlays for imports, on net there is an exodus of productive resources from the region (as embodied in goods and services traded). In this sense the region is loaning its resources to other areas, the region is a net investor, or exporter of capital. By the same token, if imports exceed exports, the region is receiving a net inflow of capital from outside. *It is patently absurd to argue that the way to make a region grow is to invest the regions savings somewhere else, and that an influx of investment from outside is inimical to growth.* If anything, it would seem more plausible to infer that a regions growth is enhanced if its capital

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<sup>3</sup> Tom Johnson pointed out that two other possibilities (that have the same effect) are that liabilities relative to other regions are reduced, or that assets in other regions are acquired.

<sup>4</sup> Tom Johnson points out that this is true only if they are sound investments. The assets are the wealth at time 0. If these are invested poorly, wealth will decline. More importantly from the residents’ point of view it doesn’t matter where the investments are made.

stock is augmented by outside which means that the regions *imports should exceed its exports*, (Quoted in Kilkenny and Partridge, 2008, p. 3)

The difficulty with this assertion is that a region with an excess of imports over exports may be borrowing to make real investments in plant and equipment (as implied in the quotation), or it may be borrowing to finance consumption. An increase in real wealth cannot be inferred, then, by looking at the net trade balance (by looking at whether the export of goods and services from a region is less than the imports of goods and services) without additional information about consumption and investment in a region. In addition, there are other sources of funds for real investment. As Kilkenny and Partridge note, “New investment is constrained by available funds, which can come from retained earnings, external funds or donations/subsidies” (2008, p. 3).

It is clear from this discussion that it is not easy to estimate wealth creation in small regions. This is both because data on regional assets are very poor, and because the conceptual links in regional economic accounting between easily-measured net trade flows and net changes in assets are problematic (largely because all regional assets are not owned by regional residents, because there are offsetting flows of taxes and transfer payments by out-of-region governments, and because additional regional debt can be used for consumption or real investment) and because real and financial assets can be double-counted. Knowledge of net trade flows provides part of the information needed. But additional information is needed. At a minimum, it is also important to (1) distinguish changes in real assets from changes in financial assets; (2) know what is happening to the offsetting flows; (3) know how much a region is saving and how much it is spending on real investment in assets; and (4) know where the owners of the various assets reside; (5) know the average rate of return on various assets; and (6) know the assets being imported and exported by in- and out-migrants to the region.<sup>5</sup> Most of this information is very difficult to obtain.

Our approach in this paper is to attempt to understand the resources available in a region for wealth creation by looking at major economic flows for which data are available. We attempt to estimate a “regional current account balance” for each region. To estimate the current account balance, we start with the net regional trade balance. This current trade balance does not take into account payments to households and businesses that are not related to current production and trade. It does not consider three flows that are important to the region’s overall current account: transfer payments; dividend, interest and rental income; and federal taxes<sup>6</sup>. We add transfer payments and dividends, interest and rent payments that flow into the region and subtract federal taxes that leave the region.

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<sup>5</sup> We are indebted to Tom Johnson for the last two of these factors.

<sup>6</sup> IMPLAN’s Social Accounting Matrix (SAM) for each region include estimates of important offsetting flows: state and local government borrowing and investment; regional household savings, and business investment and retained earnings; and federal government taxes from, and transfers to, regional households, businesses and governments. We did not use estimates of these flows from the IMPLAN SAMs because we did not have access to IMPLAN SAM data and because for many of the important flows in the SAM the IMPLAN estimates are balancing entries, which are somewhat contestable.

We use county-level estimates of the U.S. Bureau of Economic Analysis (BEA) for transfer payments and dividends, interest and rent, and of the Tax Foundation estimates for federal taxes. We aggregate the county level estimates to get estimates for each regional core and periphery.

### **Two Natural Resource-Rich Regions: Central Appalachia and the Pacific Northwest**

The bases for wealth creation in natural resource-rich regions depend, among other things, on the renewability of the natural resources, the competitiveness of the region's natural resource industries and the ownership of the natural resources. We have chosen to examine two regions with very different resource bases, and different patterns of ownership. The Central Appalachian region is rich in coal resources, extracting a non-renewable resource, and which is to a very large degree owned and controlled by people who do not live in the region. This ownership pattern has a long history in these communities as commercialization of Appalachian's coal fields occurred with the development of railroads. This process had as early of a start as the 1850s in Eastern Tennessee (Jones, 2008) and by 1883 West Virginia's railroad lines were complete and the state became a major exporter of coal (WV Office of Miner's Health Safety and Training, 2009). Although ownership data is hard to find, the Appalachian Land Ownership Task Force collected information on 20 million acres of surface and mineral right in 80 counties in Appalachia. Their results indicated a heavily concentrated pattern of ownership of which absentee owners controlled 72 percent of all land and 80 percent of all mineral rights (ALOTF, 1983).

Oregon in the Pacific Northwest, on the other hand, is rich in both timber resources and agricultural land that is used for the production of wheat, cattle, nursery products, and other agricultural commodities. Timber is a renewable resource and agricultural products can be produced in a sustainable fashion. According to the 2007 Census of Agriculture released by the USDA, 26.7 percent of Oregon's land area is used as farmland. These 16.4 million acres of farmland are split among pasture (55.8 percent), cropland (30.6 percent), and timber land (10.5 percent). Nearly 9 out of 10 farms are owner operated and serve as the operator's place of residence. Agricultural land acres are not distributed equally across the state's farms, however, and data by ownership is not provided on an acreage basis. Instead, we can use ownership structure to approximate local and nonlocal. Families and individuals own 52.4 percent of all land and this category is likely to be locally owned and operated. Partnerships, family held corporations, nonfamily held corporations and other ownership structures are also present although these categories could represent local or nonlocal ownership and profit accrual. One-fifth of all farmland is rented but as with the ownership structure, it is impossible to determine where the owners reside and where the majority of profits accrue. Ownership of timber and timber land is split almost evenly between the federal government and private landowners, many of whom are local; management decisions are made both by the federal government and by local owners and managers under a regulatory structure of federal and state regulations. (Adams and Gaid, 2008)



## *II. Core and Periphery in Central Appalachia and the Oregon*

### **Defining Regions using BEA Economic Areas, Cores and Peripheries**

We have selected for analysis five multi-county regions in Central Appalachia and four multi-county regions in Oregon. These were selected from the 179 U.S. regions defined by the U.S. Bureau of Economic Analysis based on commuting and trade patterns, and include both relatively large and relatively small BEA regions. Although there are many ways to define regions and to designate rural and urban, we have chosen the BEA economic areas as the appropriately cohesive market areas in which to study trade flows. The methodology used to create BEA economic areas defines regions around metropolitan statistical areas, called nodes by the BEA, and referred to as cores in this analysis. The surrounding counties in each region are referred to as the periphery.

The 22 core counties of our two regions contain 21 metropolitan counties and 1 micropolitan county, and of our 190 periphery counties, slightly more than half (97 counties) are non-core nonmetropolitan counties. Noncore counties have small urban areas (10,000 or less) and weak commuting links (less than 25 percent of all employed residents or all jobs commute or are filled by commuters.). The remaining periphery counties are split between micropolitan (46 counties) and metropolitan (47 counties). Although we occasionally identify the periphery as rural, it is clear that one quarter of these counties are metropolitan.<sup>7</sup>

BEA's economic areas (EAs) are built up from economic nodes and component economic areas (CEAs) in a regionalization scheme designed to represent regional markets for labor, products, and information (Johnson and Kort, 2004). First designated in 1969, the BEA areas were redefined in subsequent years to reflect methodological changes and new data. The current definitions were created in 2004 based on the 1995 methodology but updated to reflect new MSA classifications and to incorporate the 2000 Census commuting data<sup>8</sup>.

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<sup>7</sup> Perhaps a better characterization of the rurality of counties than "nonmetropolitan" can be found in Isserman's (2005) classification of counties as urban, mixed urban, mixed rural and rural. While the OMB's classification considers the degree of urban integration by using commuting flows and urbanized area thresholds, Isserman's four rural to urban character codes consider the degree of rural-urban separation and use population density and urbanized area thresholds (Isserman, 2005). Within this classification the region is much more rural than OMB's classification suggests. The region contains only 4 urban counties all found in cores (two counties in the Portland, OR core, one county in the Nashville core, and the core county in Lexington). The periphery is dominated by rural character counties (132), places with a low population density (less than 500 people per square mile), mostly rural areas (90 percent of the population lives in a rural area as classified by the Census Bureau), and small towns (all urbanized areas are less than 50,000). A majority of the core and slightly more than one-third of the periphery is mixed rural or mixed urban. In Central Appalachia, 67 percent of the counties are rural, an additional 29 percent are mixed rural, 3 percent are mixed urban, and 1 percent urban. The Oregon region is also more rural than urban but the region has more mixed rural counties (50 percent) than rural (42 percent), 3 percent are mixed urban and 5 percent are urban.

<sup>8</sup> A fuller description of the BEA's methodologies can be found in Appendix A, for additional details and a full list of all BEA regions see (Johnson and Kort, 2004).

Economic nodes are determined from the Office of Management and Budget (OMB) definition for combined statistical areas (CSAs), metropolitan statistical areas (MSAs), and 37 economic nodes are based on micropolitan statistical areas<sup>9</sup>. Seventy percent of the remaining counties are added to an economic node based on 2000 commuting patterns and 20 percent were assigned based on newspaper circulation.

In Central Appalachia, there are 5 EAs with 15 core counties and 159 periphery counties.<sup>10</sup> The EAs are Nashville TN, a large region; three medium-sized regions [Lexington KY, Knoxville TN and Charleston WV], and a medium-small region [Johnson City/Tri-Cities].

In the Oregon region, there are 4 EAs with 7 core counties and 31 periphery counties.<sup>11</sup> Crossing state lines this region includes 33 of Oregon's 36 counties and five counties in the state of Washington. The EAs include a large region [Portland OR], a medium-small region [Eugene OR], and two small regions [Bend OR and Pendleton OR].

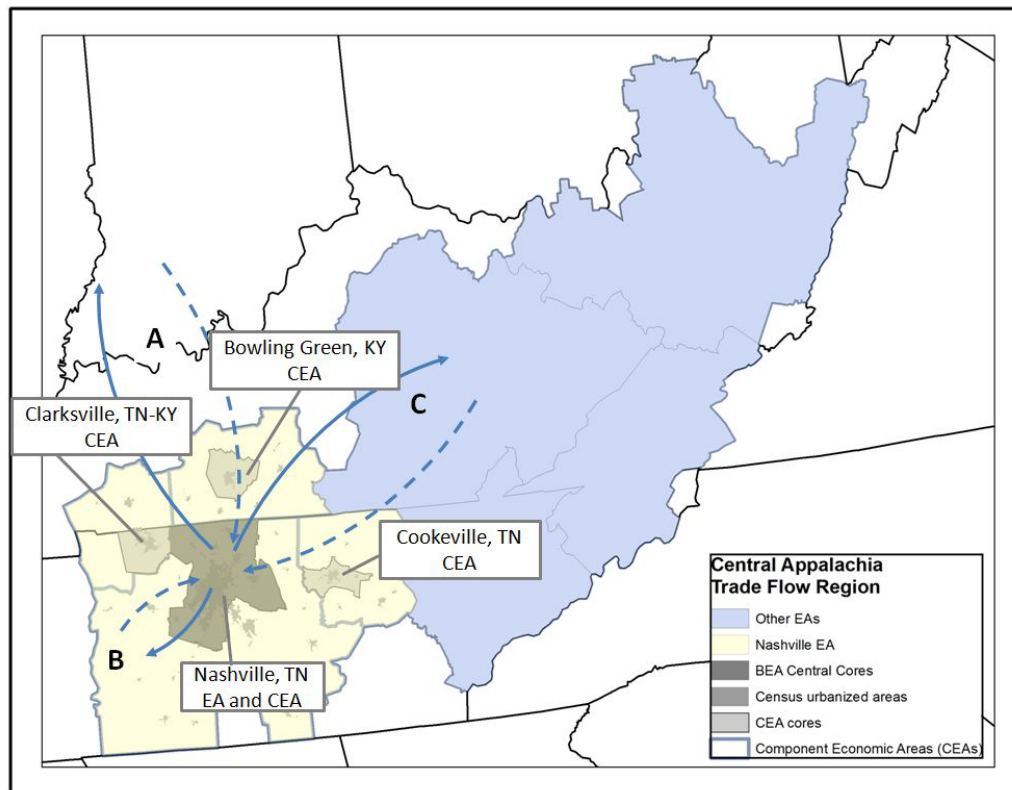


Figure 1: Schematic of three major trade flows in the Nashville economic area.

Counties in EAs and CEAs were classified either as core counties or periphery counties. Each EA has a single, contiguous core region. The core consists of the central metropolitan

<sup>9</sup> Micropolitan statistical areas must meet one or more of the following to be designated as CEA node: have a population of at least 50,000, be comprised of three or more counties, or contain one county which serves five or more counties as a primary source of news according to newspaper circulation.

<sup>10</sup> Within these EAs are 13 CEAs with 31 core counties and 142 periphery counties.

<sup>11</sup> Within these EAs are 8 CEAs with 13 core counties and 25 periphery counties.

counties of each EA, and does not include the central counties of component economic areas that make up the EA. Figure 1 shows the four CEAs within the Nashville EA. The cores of each CEA are labeled, and the Nashville MSA serves as the core of both its own CEA and the larger EA. A majority of the following analysis examines trade flows between EAs and the rest of the world (labeled A), flows between the core and the periphery of the EA, in which the periphery of the EA contains the cores and peripheries of all CEAs within the boundary, (labeled B), and finally the flows between the Nashville EA and the rest of the Central Appalachian region (labeled C). Although Figure 1 depicts all flows as originating from or destined to the core, the analysis describes flows from the entire EA, the core, or the periphery.

## **Defining Commodities**

Our trade flows across IMPLAN's 440 commodities (which represent one or more NAICS six digit industrial classifications) were aggregated into 63 sectors by RUPRI which we use to characterize the region in terms of its specialization and to provide an aggregated look at who depends on who for what within the region.

In the aggregation, the natural resource sectors of agriculture, mining, and logging were left as disaggregated as possible. Among value added commodities, food manufacturing aggregates all types of fresh and frozen manufacturing, textiles and apparels combines the use of both natural and synthetic fibers, oil and gas mining services and other mining services represent some value added potential for the coal industry, and 14 unique timber processing and wood manufacturing industries complete our list of value added natural resource base manufacturing. The sectoring scheme also highlights the contribution of tourism by considering recreation-related retail separately from nonrecreation-related retail, and additional sectors that may more often serve outsiders to the region than local residents including amusements, hotels, other accommodations, restaurants, and scenic and sightseeing transportation. Among manufacturing industries, other than the ones listed above, the following aggregations were produced: petroleum products; chemical products; rubber and plastics; stone, glass, and masonry products; primary metals and foundries; fabricated metal products; nonelectric machinery and equipment; electric machinery, equipment and appliances; transportation equipment; and other miscellaneous manufacturing. Service industries were separated into six business and related professional services, education services, and health and social services. Commonly used two digit aggregations of utilities, construction, wholesale trade, transportation and warehousing complete our portrait of the economy. Different aggregation schemes would alter the results reported below.

Our analysis looks at the flow of commodities or goods and services<sup>12</sup> locally, within the larger region, and the rest of the world (combining both the US domestic and foreign

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<sup>12</sup> Some IMPLAN data are organized by industry and some by commodity. Our analysis uses commodity data not industry data. In the IMPLAN software, firms are organized into industries based on the primary commodity which they produce, although many firms produce more than one commodity. Two simple examples represent the possible differences: a popular restaurant which receives a majority of their sales

markets). The following section describes each region in terms of its largest exported commodities. There are many ways to characterize a region's economy, trade flows emphasize the export capacity of regions and what sectors are creating wealth by drawing in cash funds to a region. Other views of specialization consider total employment by industry. To assess the future wealth creation potential of a region, a complementary analysis may examine occupational structure within a region and national forecasts of desired high growth, stable, or non-outsourcable occupations (Feser, 2003).

### **Characteristics of the Region**

We selected regions considered to be natural-resource-rich with a wide range of population sizes and total production. The Central Appalachian region with a total population of 1.5 million is larger than the Oregon region's population of 1.0 million. The largest region of Portland, OR produced \$254.3 billion in goods and services while the smallest region of Pendleton, OR produced \$8.5 million. Our geographic regionalization did not produce a pattern of core or periphery economic size dominance. Core and periphery economies are roughly the same size in terms of production and population in two Oregon (Eugene, Pendleton) and two Central Appalachian regions (Knoxville, Johnson City). In two Oregon regions (Portland and Bend), the cores are much larger than the peripheries; and in three Appalachian regions (Nashville, Lexington, and Charleston), peripheries are much larger than the cores. Table 1 provides some information on each of the nine regions selected for study, and of their core and periphery counties. The regions are listed in order of the rank assigned by BEA, which is based on 2007 employment (not shown).

The Central Appalachian region produces primarily heavy industrial goods. Comparing the top three exports of each region, three of the regions specialize in transportation equipment and three specialize in chemical products (see Table 1). Coal mining, food manufacturing, primary metals, electrical machinery, fabricated metal, and nonelectrical machinery complete the region's primary exports. The Oregon region produces both electric machinery and natural resource goods (agricultural and wood products). Per capita income varies by economic size, with the largest regions having the highest per capita income<sup>13</sup>. Core per capita incomes are significantly larger than periphery per capita incomes, except for Hermiston OR, the smallest and lowest income region. Oregon regions have higher per capita incomes than their similar-sized Appalachian counterparts.

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from food and beverage service may also have a gift shop which offers retail merchandise. The single establishment is classified as a restaurant and not a retailer. Secondly, and more problematic are manufacturing companies which have multiple lines producing heavy machinery for both farm and construction uses and some smaller tractors and lawnmowers used as lawn and garden equipment. This business would be classified by its primary product even though the lines might contribute similar percentages to the company's total production.

<sup>13</sup> Per capita incomes provide an incomplete assessment of differences as the cost of living varies by region and in general tends to be higher in urban areas.

## ***Central Appalachia***

The five Economic Areas (EAs) in the Central Appalachian region (CAP) had a total production of \$542.8 billion in 2007 and was over one-and-a-half times as large as the Oregon region. The largest commodity in the region was health and social services which generated \$44.1 billion in sales. Real estate, construction, and transportation equipment commodities generated between \$30.5 and \$34.8 billion in sales. Additional traded services in finance and insurance, business services, legal, accounting and technical services, print and publishing services, and personal services and civic organizations ranked among the top 20 commodities and contributed \$100.2 billion in sales. Among durable goods and in addition to transportation equipment, the region's commodities also included production of chemical products, food manufacturing, primary metals and foundries, electric machinery and equipment, and fabricated metal products. This aggregation of industries contributed \$76.8 billion in the region.

The entire region had \$204.8 billion in foreign and domestic exports. The two leading export commodities were transportation equipment (\$21.6) and chemical products (\$21.1). The next two commodities ranked by value of exports are primary metals and foundries and electric machinery with \$12 and \$10 billion in export sales respectively. Commodity exports in stone, glass and machinery, food manufacturing, and fabricated metal products produced \$9 billion in total sales to the rest of the nation and world. The region is a net importer, with \$588.8 billion in foreign and domestic imports. The five most imported commodities of chemical products, business services, finance and insurance, transportation equipment, and electric machinery account for 14 percent of the regions total imports.

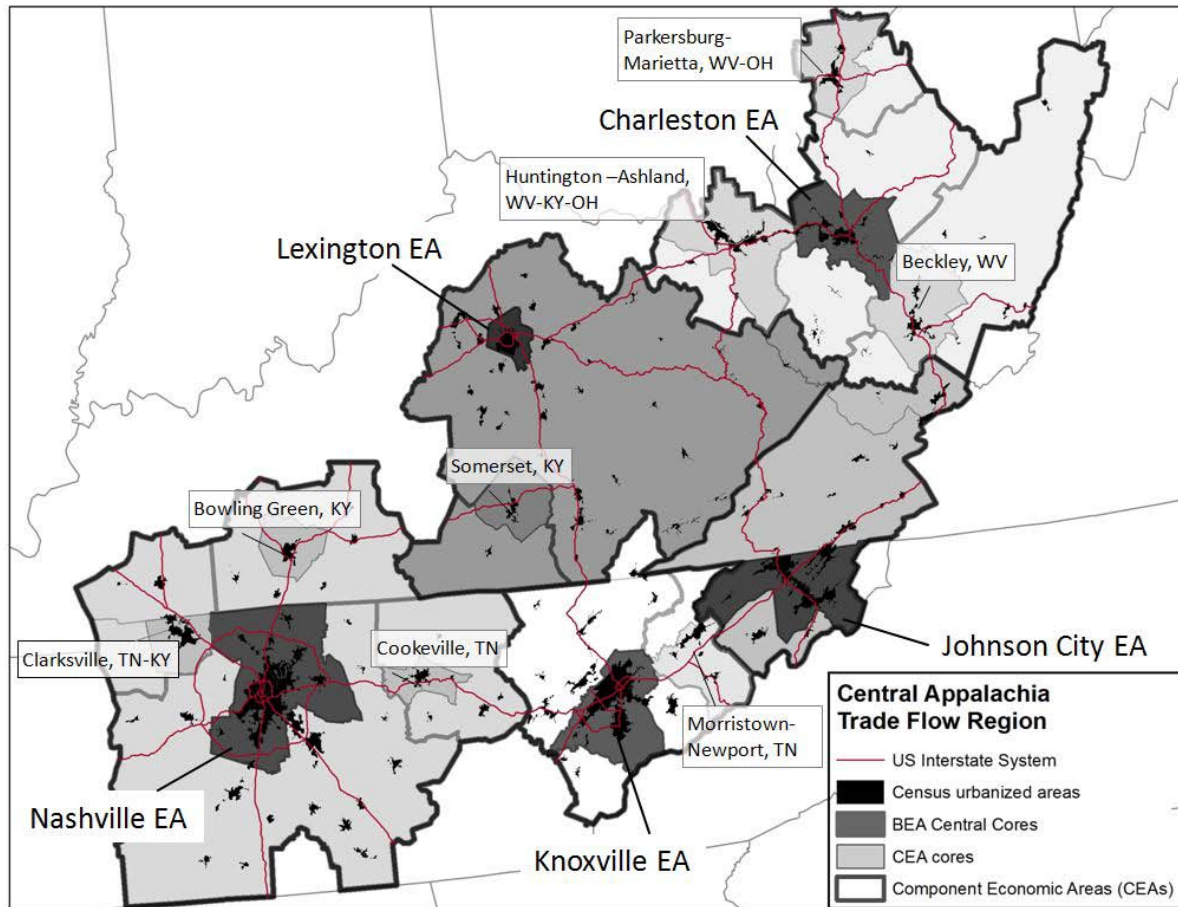


Figure 2: The five economic area study region in Central Appalachia

### Nashville Economic Area

The Nashville EA is the largest EA in Central Appalachia, with 37 percent of the Central Appalachian region's population and 42 percent of its production. The Nashville EA exported \$82 billion in 2007, 36 percent of its production, outside the Central Appalachian region. The major commodity exports are transportation equipment (14 percent of the EA's exports), chemical products (8 percent), food manufacturing (6 percent), electrical machinery and equipment (5 percent) and business services (5 percent).

#### Core

The Nashville core economy accounts for just over half of Nashville EA production. Nashville core exports are concentrated in services, led by health and social services (9 percent of the core's exports), business services (8 percent), transportation equipment (8 percent), legal, accounting and technical services (7 percent) and printing, publications, communications and information services (6 percent) (See Table 2A). The core exports 8 percent of its production to the Nashville periphery and imports 3 percent of its purchases from the periphery. Linkages among the regions are quite weak: the Nashville core sends 1 percent of its production to the Lexington EA and 33 percent of its production outside the

CAP region. The core has no significant import trade with the other CAP EAs and imports 36 percent from outside the CAP region.

### *Periphery*

The Nashville periphery economy is concentrated in heavy industry. The five leading export commodities are transportation equipment (20 percent of exports), chemical products (10 percent), food manufacturing (7 percent), primary metals and foundries (7 percent), and rubber and plastics (6 percent). Like other peripheries, the periphery has slightly weaker export links and stronger import links to the core than the core does to the periphery: the periphery exports 3 percent of production to the core and imports 8 percent of its inputs from the core. It exports 1 percent of production each to the Lexington and Knoxville EAs and 39 percent to outside the region. Imports are purchased 1 percent each from Lexington and Knoxville and 44 percent from outside CAP.

Exports by core and periphery within the Appalachian region show the periphery produces the region's primary export commodity in Nashville and Lexington. Service exports are found in the cores and are the largest in Nashville. Among natural resource sectors, coal mining is one of the top three exports in Charleston and Johnson City and is a primary export in both peripheries. Stone, glass and masonry products are the largest export in the Lexington EA and are produced exclusively in the periphery.

### ***Oregon***

The four Economic Areas (EAs) in the Oregon region had a total production of \$318.3 billion in 2007. Real estate, construction and health and social services each generated more than \$20 billion in sales. Other major commodities generating more than \$10 billion in sales included business services, finance & insurance, wholesale trade, government payrolls, electric machinery, legal services, food manufacturing, and printing and information services.

The entire region had \$103.2 billion in foreign and domestic exports. The leading export commodity was electric machinery with \$12.9 billion in export sales, twice that of the next highest export commodity. The next four commodities ranked by value of exports are transportation equipment, food manufacturing, business services and paper products. The region is a net importer, with \$112.1 billion in foreign and domestic imports. The most imported commodities are finance and insurance, electric machinery, food manufacturing, petroleum products and chemical products.

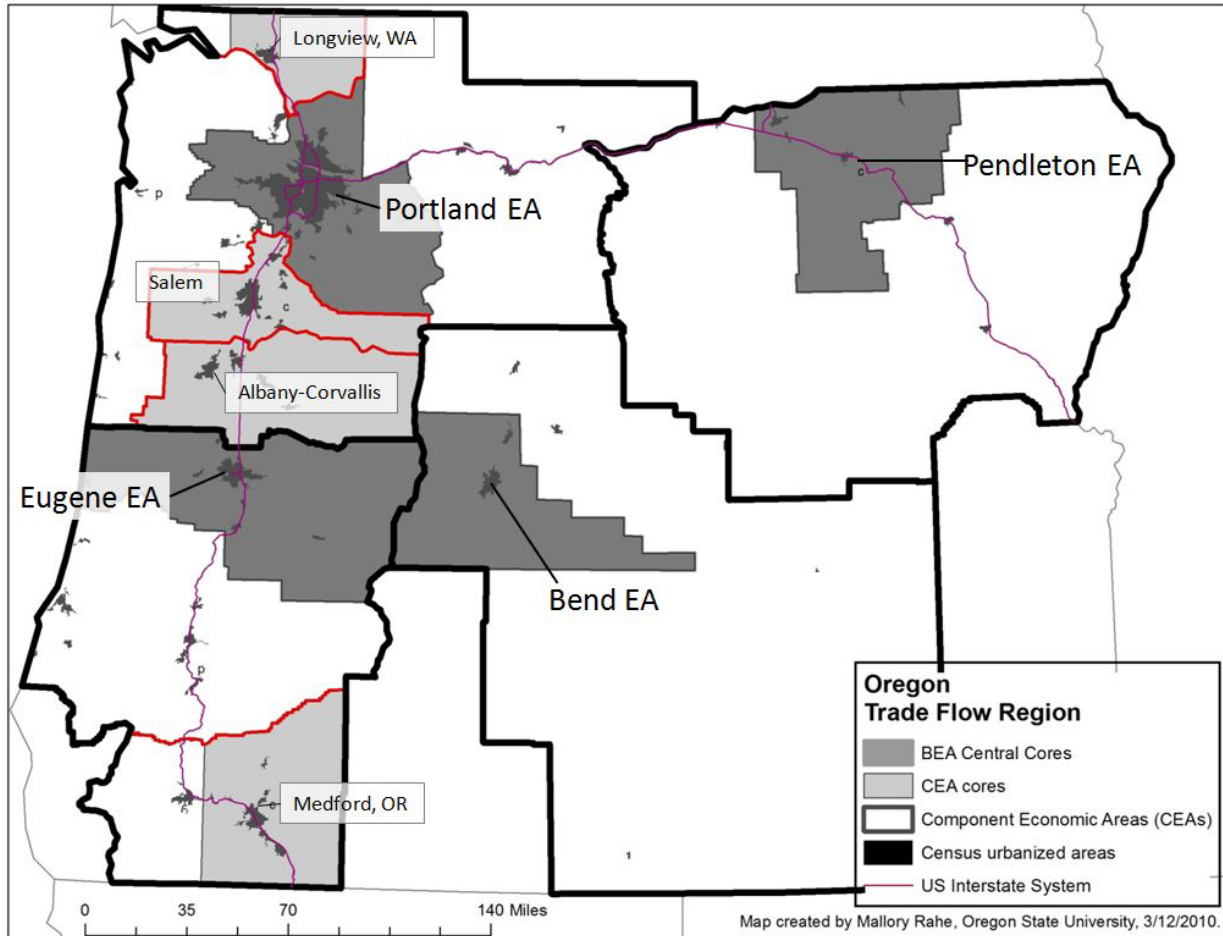


Figure 3: The four economic study region in Oregon and the central core of Portland

### Portland Economic Area

The Portland EA – the 15-county area that holds 72 percent of the region’s population and 77 percent of its production – dominates the Oregon region. The Portland EA exported \$78 billion in 2007, 32 percent of its production outside the Oregon region. Portland’s major exports are electric machinery (15 percent of the EA’s exports), food manufacturing (7 percent), and paper products (6 percent).

#### Core

The Portland core economy accounts for almost three quarters (74 percent) of Portland EA production. Portland core exports are led by electric machinery (19 percent of the core’s exports), business services (7 percent), wholesale trade (6 percent), and printing and information services (6 percent). The core exports 4 percent of its production to the Portland periphery and imports 3 percent of its purchases from the periphery. It exports 1 percent to the Eugene EA and 31 percent of its production outside the Oregon region. The core imports 1 percent of its purchases from the Eugene EA and 31 percent from outside the Oregon region.



## *Periphery*

The Portland periphery economy is heavily concentrated in natural resource industries. The five sectors with the highest total exports are paper products (17 percent of exports), food manufacturing (12 percent), primary metals and foundries (7 percent), electric machinery and equipment (7 percent), and crop farming (5 percent). Logging ranked sixth with 4 percent of total exports. The periphery has relatively weaker export links and stronger import links to the core than the core does to the periphery: the periphery exports 8 percent of production to the core (food manufacturing, and health and social services were the leading sectors) and imports 11 percent of its inputs from the core. It exports 4 percent of its production to the Eugene EA and 34 percent to outside the Oregon region.

In Oregon the cores produce the primary export in three of the four regions. Only one service, business services is a top three export and can be found in three regions. Peripheries in the region are not major exporters of services, and are more specialized in the natural resource sectors. Similar to coal mining, the natural resource commodities of crop and animal farming and sawmills are a major export in the peripheries of three OR regions. The cores and peripheries equally export manufactured goods, although electric machinery, equipment, and appliances – the largest export in the OR region – are a major export in only the cores of two regions (see Table 2B). The trade patterns of the remaining seven EA regions and their cores and peripheries are described in Appendix A.

### **III. Rural- Urban Linkages and other Trade Flows**

Rural-urban trade linkages will be discussed through an analysis of trade flows within EAs, between EAs and the rest of the world, and flows between the cores and peripheries of EAs within the region. We begin by looking at regional trade flows – exports from each region and imports to each region from IMPLAN interregional input-output accounts. Our general expectations are that (1) larger EA regions will have positive net trade balances with smaller EA regions, (2) EA core subregions will have positive net trade balances with their rural periphery subregions. We will examine each of these general expectations in turn.

Each EA in our analysis has three primary destinations and sources for traded commodities as indicated on Figure 1. The larger the internal flows are within an EA, or the more goods and services which are traded within the region, reflect both an internal capacity to meet local demand with services and the degree of compatibility among local businesses which can source intermediate or final goods locally. The cross flows from one EA to another similarly capture both sourcing services regionally from larger order urban areas and the complementarities between EAs. Building clusters around a value chain is one strategy regions use to boost interdependence in the hope of attaining faster growth.

#### **Internal Use**

The Oregon region satisfies a larger total percentage of commodity demand from internal supply than the CAP. In Oregon, 63.8 percent of all commodity supplies are used within the

EA in which they were produced. This amount of internal EA trade satisfies 62.0 percent of commodity demand. Comparatively, in the CAP, 59.0 percent of all commodity supplies are used with the EA in which they were produced and 54.4 percent of all commodity demand comes from internal EA flows.

The amount of internal use is the highest in the largest EAs (Portland 66 percent and Nashville 62 percent) and decreases along the hierarchy. This pattern of higher internal use among larger regions is broken by the Lexington EA which internally supplies the smallest percentage of total commodities used. Although the EA buys the highest percentage from the world it also buys the most from within the region: the Nashville EA and the Charleston periphery each contribute 2% of total imports. Cores satisfy a higher percent locally than peripheries with the exception of Eugene and Johnson City. Peripheries in Oregon supply relatively less demand locally (ranging from 53 percent to 29 percent) than in the larger EAs of the CAP region (55 percent to 47 percent).

## **Rest of World**

### *Exports*

All EAs in both regions export nearly a third or more of their production. Central Appalachia sells an average of 37.7 % of all supply to the rest of the world and Oregon sells 32.4% to the rest of the world. Smaller regions export a higher share of their total production to the rest of the world than larger regions. Peripheries export a higher share than cores within the same EA with the exception of Eugene and Johnson City.

The CAP regions export within a similar range of 36 percent to 40 percent of total production (see Table 3A). The largest urban production regions of Nashville and Knoxville export the least amount to the ROW. There is a wider variation among Oregon EA's, but again the largest core Portland exports the smallest percent of its total production at 32 percent (see Table 4A).

### *Imports*

A similar pattern exists among total imports, Central Appalachia on average imports a larger share (42.6 percent) of its commodity demand than the Oregon region (34.3 percent). Central Appalachian EAs import 39% to 47% of commodity demand (Nashville and Knoxville import the least and Lexington a large region with a small core imports the most) (see Table 3B). In the Oregon region, EAs import 32% to 43% of commodity demand. The differences between core and periphery imports as a percent of total commodity demand vary less but peripheries tend to source more demand from the rest of the world than cores (see Table 4B).

## **EA to EA**

The Oregon region has a more interconnected economy within each EA than Central Appalachia. And Oregon has both slightly stronger ties between EAs , sources more of its

demand for commodities internally, and relies slightly less on rest of world imports and exports than the CAP. The CAP buys 3.0 percent of all commodity demand from EAs in the region and sells an average of 3.3 percent of all production internally. The Oregon region is similar selling 3.8 percent of all production internally satisfying 3.7 percent of total demand from other EAs in the region.

#### *Large and small region differences*

The Nashville EA's trade links with the rest of the CAP region are relatively weaker, supplying 1.5% of demand and selling 1.9% of supply, than the Portland EA, buying 2.2% of demand within the region and selling 2.5% percent of supply within the region. The only EAs with which Nashville trades more than one percent of production are the Lexington and Knoxville EAs (see Tables 5A and 5B). Its import links are even weaker, as no Central Appalachian EA provides more than 1 percent of Nashville's imports. All four CAP EAs export at least 1 percent of their exports to the Nashville EA, but this represents a relatively smaller share than found among Oregon's smaller EAs.

There is no clear hierarchical relationship among the EAs in Appalachia. Nashville has positive trade balances with the Lexington and Johnson City EAs, small negative trade balance with Knoxville and Charleston and a sizeable trade deficit with the rest of the world. The CAP regions rely relatively less on the urban core of Nashville for imports with the exception of the Lexington EA.

Johnson City is the only region which exports 1% of its exports to every other EA in the region, however this region is so much smaller than its neighboring EAs that the amount of the exports are insignificant to the receiving economies. Major exports include transportation equipment and transportation equipment and transportation warehousing to Nashville, Lexington and Knoxville, and oil and gas and petroleum products to Charleston.

Portland better fits our expectations about an urban hierarchy and has positive trade balances with all three of the smaller Oregon EAs. The core serves as a supplier to the larger region but a majority of its traded commodities are used internally or traded with the rest of the world. The only EA with which it trades more than one percent of production is the Eugene EA to which it exports 2 percent of production and from whom it imports 2 percent of commodity demand (see Tables 6A and 6B). Portland and Eugene exchange a similar quantity of goods in each direction. All other economies in the Oregon region import 6 percent or more of their total imports from the Portland EA. Pendleton, the state's smallest economy, relies on Portland for 10 percent of its imports but this flow of goods and services is less than 1 percent of the Portland's economy. The Portland EA has a small negative trade balance with the rest of the world.

#### *EA core and periphery trade*

Peripheries in both regions trade more across the region than cores do. Lower order EAs trade more with higher order EAs than with other lower order EAs. There are more trade

flows between the dominant EA and its core with the rest of the region than between lower order EAs. In the CAP region, the Lexington core has few flows to other EAs although the periphery has the largest flows of any core or periphery.

A majority of all core to periphery trade in the Oregon region occurs between the Portland EA and the three smaller EAs. The peripheries of Portland, Bend, and Pendleton and the core of Eugene exchange the most goods and services with the Portland EA core. Internally the trade links are highest between these areas, largely peripheries, and the cores of Portland and Eugene. Peripheries are dependent on cores within the two largest EAs in a pattern that holds for both imports and exports.

#### *Trade Balances between Rural and Urban Areas*

Within every EA, the core has a positive trade surplus with the periphery. Cores of larger regions tend to have larger trade surpluses as a share of production with their peripheries than cores in the smaller regions. Exceptions to this among the larger regions are Lexington and Charleston, whose cores are small relative to the periphery. The exception among the smaller regions is Bend, which is relatively isolated (has no interstate highway) and has a large core relative to the periphery. Nashville has the largest trade surplus with its periphery as a percent of the EA production (2.8 percent). However, there is not a consistent pattern of trade surplus across the hierarchy (see Table 7).

#### ***Regional Current Account Balances: Sources of Potential Wealth Generation in Central Appalachia and the Oregon Pacific Northwest***

As noted in the introduction, a region's current account balance provides an estimate of the resources flowing into or out of a region and thus the resources potentially available in a region for wealth creation. The net current account balance of each region is the sum of the region's net trade balance and the flows of funds into and out of the region that are not related to current production and trade.

#### **Economic flows not related to current production and trade**

Households and businesses in each region receive income and make payments not related to the production of a region's goods and services. Our estimate of the regional current account balance incorporates three of the most significant: transfer payments; dividends, interest and rent; and federal taxes. Because we do not know the sources of the DIR payments, it is not possible to separate out the portion of dividends, interest and rent (DIR) that is already accounted for in a region's production estimates. To the extent that the DIR estimate includes payments related to local production, it overstates the flow of funds and the contribution of DIR to the current account balance. On the other hand, almost all personal transfer payments are from the federal government and come into the region from outside, and all federal taxes leave the region.

Our estimates of transfer payments and of dividends, interest and rent (DIR) are from the Local Area Personal Income data estimated by the U.S. Bureau of Economic Analysis.<sup>14</sup> Transfer payments (technically, personal current transfer receipts) are payments received by individuals for which no current services are rendered. They include retirement and disability payments (including Social Security, workers compensation and black lung payments), medical benefits (Medicare, Medicaid and military medical insurance benefits), income maintenance benefits (TANF, SNAP [formerly Food Stamps] and Supplemental Security Income benefits, general assistance, EITC, WIC and energy assistance), state unemployment insurance benefits, veterans benefits and federal education and training assistance.

Dividends, interest and rent comprises personal dividend income, personal interest, and net income of persons from the rental of real property, the net imputed rental income of owner-occupants of nonfarm dwellings, and royalties from copyrights, patents and natural resource rights.

Federal tax payments were taken from the Tax Foundation's on-line report *Federal Tax Burden by County, Congressional District and Major City Area* which includes a database on federal tax burden by county for 2004 and a Special Report *Putting Taxes on the Map: Federal Tax Burdens by City, County, Congressional District and State* (No. 150) by Andrew Chamberlain and Gerald Prante. The estimates include individual income taxes, payroll taxes, corporate income taxes, excise taxes and estate and gift taxes. Because corporate income taxes are about 10 percent of total tax payments, these estimates somewhat overstate the direct household outlays for taxes.

### **Regional current account balances**

Table 8 presents our estimate of the current account balance for each region and each core and periphery. The rows at the bottom of the table show the values of current account elements for Oregon and Central Appalachia and for cores and peripheries in each region. The table begins with the net trade flows of each region and each region's core and periphery and then looks at the extent to which the external flows not related to current production and trade either offset the net trade deficits or (in three cases – the cores of Portland, Nashville and Knoxville) augment the net trade surplus. The table identifies each of the non-trade-related flows separately: the transfer payments, and dividends, interest and rent flowing into each core and periphery and the taxes paid to the federal government from these regions.

### ***Net Trade Balances: Trade surpluses and deficits***

Every one of the regions in Appalachia and Oregon has a trade deficit with the U.S. and rest of the world (hereafter just called the rest of the world). Appalachian regions have much larger trade deficits as a share of production than Oregon regions. As a share of production,

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<sup>14</sup> Transfer payments are from Table CA-35 and dividends, interest and rent are from Table CA-05.

regional trade deficits are equivalent to -8.5 percent of production in Appalachia and -3.1 percent of production in Oregon.

The pattern of trade balances is quite different for cores and peripheries, however. When balances are summed over all regions, the cores in both regions have a slight surplus (equal to 1.4 percent of production in Appalachia and 0.3 percent of production in Oregon), whereas the peripheries have a very substantial deficit (-16.7 percent of production in Appalachia and -10.9 percent in Oregon).

This result is driven by the pattern in the two largest regions, however. For the two largest regions, Portland and Nashville, the cores have a relatively large trade surplus with the rest of the world, equal to 3.4 percent of production in Portland and 5.1 percent of production in Nashville. These are offset, however, by large trade deficits of the peripheries (-10.8 percent of production in Portland and -19.7 percent in Nashville). The Knoxville core also has a small surplus – 0.6 percent of production – that is smaller than its periphery deficit.

For every other region, both core and periphery have trade deficits. In the Appalachian regions other than Nashville and Knoxville, the trade deficits of the periphery are much larger than the trade deficits of the core both absolutely and as a share of production. For the Oregon regions other than Portland, the trade deficits of the cores are larger than those of the peripheries, both absolutely and (except for Bend) as a share of the region's production.

### ***Non-trade-related flows: dividends, interest, rent, transfer payments and federal taxes***

The current account balance of a region is the sum of the trade surplus or deficit and certain flows of funds that are not related to production or trade. In this study, we include three key non-trade/production-related flows: we add to the net trade balance the inflows of funds to the region from dividends, interest, rent, and transfer payments and subtract the outflows of federal taxes from each region.

#### *Dividends, interest, and rent*

The Appalachian regions receive considerably less in personal dividends, interest and rent (DIR) than Oregon regions both on a per capita basis (\$3,623 v \$6,555) and as a share of income (12.3 percent v 19.5 percent) (See Table 9). The comparable share for the nation is 17.5 percent.

Dividends, interest and rent are more important sources of income for smaller regions than for the largest regions. DIR make up smaller shares of personal income in Portland (7.8 percent) than for the smaller Oregon regions, and in Nashville TN (4.5 percent) than for the other Appalachian regions.

For Appalachia and Oregon as a whole, DIR income per capita is higher in core economies than in periphery economies in both Appalachia (\$5021 core v. \$2869 periphery) and Oregon (\$6959 core v. \$5903 periphery). And, in each core region (except agriculture-

dependent Pendleton), DIR income per capita is also higher than in its corresponding periphery. The relative importance of DIR income (DIR as a share of personal income) to core and periphery economies is quite different in Appalachia and Oregon, however. For Appalachia, DIR constitutes a greater share of income in each core than in its corresponding periphery. The DIR share of income in Appalachia cores is 13.8 percent v. 11.1 percent in Appalachian peripheries. In the Oregon regions, however, periphery regions in most cases have higher DIR payment shares than cores: DIR is higher in the core as a share of income only in the Bend region. For Oregon as a whole, the DIR income share is 19.2 percent in the cores versus 20.2 percent in the peripheries.

#### *Personal current transfer payments*

Contrary to the pattern for DIR, Appalachian regions receive substantially more in transfer payments than Oregon regions on a per capita basis (\$6059 v. \$5056) and as a share of income (20.6 percent v. 15.1 percent). The comparable figure for the nation is 14.7 percent. Transfer payments are relatively less important as an income source in the two largest regions than in the smaller regions: Portland OR and Nashville TN have the lowest shares of personal income from transfer payments.

Both in dollars per capita and as a share of personal income, *transfer payments are higher in every periphery than in the corresponding core*. The difference between core and periphery transfer payments receipt is greater in Appalachia than in Oregon. Both the dollar spread and the percent share of income spread between the core and periphery are greater in Appalachia than in Oregon. In the Appalachian region, the spread is \$1315 and 11.1 percentage points: transfer payments are \$6524 per capita and 25.4 percent of personal income in the Appalachian periphery compared to \$5209 and 14.3 percent in the Appalachian core. In the Oregon core, the spread is \$1187 and 7.1 percentage points: transfer payments are \$5790 per capita and 19.8 percent of personal income in the periphery and \$4603 and 12.7 percent in the core.

#### *Federal tax payments*

Given that total income is so much greater in Appalachia (\$214 billion) than in Oregon (\$138 billion), it is to be expected that total Federal tax payments coming from Appalachia (\$34 billion) will be larger than those coming from Oregon (\$23 billion). The federal tax burden for the Appalachian region, however, is lower than for Oregon, both on a per capita basis (\$4461 v. 5203) and as a share of personal income (15.8 percent v. 16.4 percent). The observed patterns are consistent with what would be expected given the progressivity of the federal tax system. The federal tax burden (federal taxes as a share of personal income) is higher in the regions with higher personal income per capita. The two largest regions (Portland OR and Nashville TN), with the highest personal incomes per capita, have the highest federal tax burden.

Contrary to what was the case with transfer payments, *federal tax payments are higher in every core than in the corresponding periphery*, both in dollars per capita and as a share of

personal income. The only exception to this is in Pendleton where per capita federal taxes (though not taxes as a share of income) are slightly higher in the periphery.

### *“Net federal impact”*

Because the federal government both receives taxes from households in each region and sends transfer payments to households that are not directly related to production and trade, many are interested in the “net federal impact” on states and localities.<sup>15</sup> The question is often expressed this way: which regions send more to the Federal government than they get back in federal spending? Observed patterns are consistent with the redistributive role of the federal government. Higher income regions tend to have “net federal deficits” while poorer regions tend to have “net federal surpluses”.

The Appalachian region received considerably more in transfer payments than it paid in taxes. The regional “net federal surplus” (transfers in minus federal taxes out) in Appalachia was \$1398 per capita, representing 4.7 percent of personal income. Oregon, on the other hand, paid more in federal taxes than it received in transfer payments. The per capita “net federal deficit” (transfers in minus federal taxes out) in Oregon was -\$147, representing -1.3 percent of personal income.

The two largest regions (Portland OR and Nashville TN), which also have the highest per capita incomes, had relatively large “net federal deficits”, on a per capita basis (-\$1122 and -\$426) and as share of income (-5.8 percent v.-7.5 percent). The reverse is true of smaller regions: all the smaller regions both in Appalachia and Oregon had “net federal surpluses”. The two regions specializing in coal extraction (Charleston WV and Johnson City/Tri-Cities TN-VA) have the largest net federal surpluses both on a per capita basis (\$3449 and \$3594) and as a share of income (12.4 percent and 13.3 percent)

Cores in both Appalachia and Oregon regions pay more in taxes than they get in transfers showing a “net federal deficit” of -\$1308 and -\$2068 on a per capita basis and -3.6 percent and -4.5 percent as a share of income. Peripheries in both regions, on the other hand, receive more in transfers than they pay in taxes: they have a sizeable “net federal surplus” of \$2877 per capita representing 11.2 percent of personal income in Appalachia and \$1876 per capita representing 5.0 percent of income in Oregon.

### ***Net Current Account Balance***

The net current account balance is an indicator of funds that are potentially available for wealth creation. Given the imprecision of the various estimates that we are combining, our

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<sup>15</sup> Because we are concerned about only the payments that are not accounted for in estimates of commodity production, we focus on household taxes and transfers to households. We recognize that our estimates of net federal impact include some amounts that are not household transfers or taxes. Personal current transfer payments, for example, include some payments to nonprofit corporations and some transfers from businesses to individuals (amounting to less than 3 percent of transfer payments in 2004). The Federal Tax payments, as noted above, include some corporate income taxes (which amount to about 10 percent of federal taxes nationwide)



estimate of the current account balance should be regarded as a rough approximation of the magnitude of the wealth creation potential. Even if the particular estimates of current account surplus and deficit are not precise, however, observed differences across regions and between cores and peripheries are likely good indicators of actual patterns of difference.

*The net current account balance is more positive than the net trade balance in every region and in every core and periphery in each region.* The payments to households in dividends, interest and rent, plus the net impact of the federal payments (transfer payments minus federal taxes) reduce the trade deficits in every case.

In many cases, these payments are sufficient to turn a net trade deficit into a current account surplus. Each region has a net trade deficit with the rest of the world, but almost half of the regions have a current account surplus after accounting for transfers, DIR and federal taxes.

When summed over all regions, the current account balances are negative in Appalachia as a share of regional production (-1.7 percent), whereas they are positive in the Oregon (4.8 percent). This result is driven by the balances of the larger regions, however, as current account surpluses and deficits are found in individual regions in both Appalachia and Oregon. Neither size of region nor economic specialization seems to determine whether a region has a net current account surplus or deficit. The current account surpluses as a share of production occur in the largest (Portland OR at 6.2 percent) and smallest (Pendleton OR at 2.8 percent) regions and include coal-rich (Charleston WV at 1.6 percent) and heavy manufacturing (Knoxville TN at 3.5 percent) and agricultural (Pendleton OR) regions. The largest current account deficit as a share of production (-7.5 percent) is in Lexington KY.

Taken together, the core current account balances are more favorable than the periphery balances in both Appalachia and Oregon. In Appalachia, the cores are in surplus (5.3 percent of production) and the peripheries are in deficit (-7.6 percent of production). In Oregon both cores and peripheries are in current account surplus with core surpluses (6.4 percent of production) more favorable than the periphery surpluses (1.1 percent). The current account balance spread between core and periphery is much greater in Appalachia (12.9 percentage point difference between core surpluses and periphery deficits as shares of production) than it is in Oregon (5.3 percentage point difference between core and periphery surpluses).

As with the overall pattern of overall balances, this pattern of core and periphery differences is driven by the largest regions, particularly in Oregon.

In Appalachia, each core has a more positive current account balance than its own periphery. For the two largest regions and the smallest region, the core has a current account surplus and the periphery has a deficit. In the two mid-size Appalachian regions, both core and periphery have surpluses (with core surpluses larger than periphery surpluses).

In Oregon, the pattern is quite different. For Portland, the core has a sizeable current account surplus (8.6 percent of production) while the periphery has a small deficit (-0.4 percent of production). In all three smaller Oregon regions, however, the core has a worse current account balance than the periphery: the core is in deficit and the periphery in surplus in Eugene and Bend; and although core and periphery are both in surplus in Pendleton, the core surplus is smaller than the periphery surplus as a share of production.

### **Conclusions and Implications**

Wealth creation potential in a region is affected by its comparative advantage based on natural, built, financial, human and other assets; its size and place in the urban hierarchy; and by the extent and nature of interdependence between its core and periphery. It is also affected by other important factors, such as its history, land ownership patterns, culture, and by global economic trends and technological change. In this report, we have compared two regions with very different assets, levels of income and degrees of intraregional inequality. Appalachia, the lower income region, has a per capita income of \$29,466, with a \$10,572 gap in per capita incomes between the core (\$36,303) and periphery (\$25,731). Oregon, with a per capita income of \$33,564, has a per capita income gap of \$7,016 between the core (\$36,245) and periphery (\$29,229).

Regional wealth creation potential is assessed in this report by attempting to develop a current account balance for each region. This process starts by estimating the regional balance of trade and adjusts this balance with household income flows (not related to production and trade) that provide potential resources for investment in wealth. These resources include dividends, interest and rent and the net impact of federal government personal transfer payments minus federal taxes.

The trade balance in a region is the fundamental force shaping the region's wealth creation potential. Trade balances are more favorable (and thus wealth creation potential more promising) in Oregon than in Appalachia, and in large regions relative to smaller regions, and regional cores relative to peripheries. (The exception to the regional core advantage – discussed below – is in the three smaller Oregon regions.) Every region in our study, however, (and every periphery) starts out with a regional trade deficit with the rest of the world, and thus relies on a combination of dividends, interest and rent and transfer payments (net of federal taxes) to offset the trade deficits.

Dividends, interest and rent (DIR) are critical to improving the current account balance. These payments are much larger as a share of income in Oregon than in Appalachia, and have a much greater impact on final current account balances for Oregon than federal taxes and transfers. In Portland, DIR turn a small trade deficit into a sizeable current account surplus, even after netting out the relatively small (negative) federal impact. DIR are even more significant in determining the current account balance in the smaller Oregon regions and the Oregon periphery regions.

The federal role in wealth creation potential is very different in Appalachia than it is in Oregon. Transfer payments contribute more as a share of income – and federal taxes take away less – in Appalachia than in Oregon. This means that, on net, the federal impact is positive in Appalachia (adding an amount equal to 4.7 percent of personal income to the current account balance) while it is negative in Oregon, taking away from Oregon an amount equal to -1.3 percent of personal income. The net federal fund flow impact is negative in the two largest regions (Portland OR and Nashville TN) but positive in all smaller regions. The net federal effect is negative in the cores of the four largest regions and in Bend OR, but positive in all the peripheries.

In the overall current account balance (CAB), Appalachia has a small current account deficit (-1.7 percent of production) and is not able overcome the initial large trade deficit even with the help of large transfer payment flows and relatively low federal taxes because of relatively small DIR income. Oregon, on the other hand, with a smaller initial trade deficit and substantial DIR income, ends up with a current account surplus equal to 4.8 percent of production, even though the net federal fund impact is negative.

The two largest regions drive the overall results to some degree. Portland's current account surplus is 6.2 percent of the region's production, with the large DIR income (equal to 7.8 percent of production) offsetting both the negative federal fund impact (-1.4 percent) and the small trade deficit (-0.2 percent). Nashville has a current account deficit of -2.4 percent of production, with the more modest DIR (4.5 percent of production) not able to offset the larger trade deficit (-6.5 percent) and small federal funds deficit (-0.5 percent).

The current account balances of regional cores and peripheries are very different for Portland OR and Appalachia vis-à-vis Oregon's smaller regions. The cores of Portland and the Appalachian regions have CABs that are much more positive than the CABs of the peripheries. This is because in each case, the initial trade balance as a share of production was more favorable in the cores than in the peripheries and DIR are larger as a share of production for cores than peripheries.

It is the peripheries of the three smaller Oregon regions that have the more favorable CABs. For Eugene and Pendleton, the original trade deficits of the periphery were smaller than the core trade deficits, and the peripheries received larger DIR and net federal funds flows as a share of production than the cores. For Bend, the slightly larger original periphery trade deficit and slightly smaller DIR payments were more than offset by the substantially higher net federal funds surplus (resulting from the relatively higher transfer payments and lower tax burden).

Wealth creation potential is difficult to assess, given the current availability of regional data. We extracted from currently available data estimates of regional current account balances as a rough indicator of the funds that might be available in a region to invest in new assets. Based on the underlying hierarchical regional economic framework, we expected greater wealth creation potential in (1) high-technology-rich regions and those with substantial sustainable natural resource based (forestry and agriculture) production vis-a-vis regions with historical dependence on heavy manufacturing and resource

extraction (mining); (2) large urban regions relative to smaller urban regions, and (3) regional cores over their corresponding peripheries. Our findings are not entirely consistent with these expectations about the greater wealth creation potential.

We found relatively large current account surpluses in high-technology regions like Portland and agricultural regions like Pendleton, but also in heavy manufacturing and coal-rich regions like Knoxville and Charleston. We found current account deficits in large regions like Nashville and Lexington, and current account surpluses in the smallest region, Pendleton. Perhaps the most consistent finding was of more favorable current account balances in regional cores than in regional peripheries. Even here, however, the opposite was the case in the three small Oregon regions. The peripheries in these regions were helped by different combinations of smaller periphery trade deficits, higher periphery DIR, or greater periphery net federal funds impact. This suggests that, while trade balances are a fundamental determinant of regional resources available for asset creation, the asset creation potential of a region is affected in critical ways by other factors. Key among these are the geographical distribution of ownership of assets (and hence income from dividends, interest and rent) and the powerful redistributive role of the federal government through transfer payments and federal taxes. Future research on wealth creation potential would benefit from better data on asset ownership and fuller exploration of the federal government spending and tax policy.

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### **Appendix A: A more complete explanation of the BEA's regionalization scheme**

Starting with economic nodes determined by the OMB's classifications for CSAs, MSAs and micropolitan statistical areas, the BEA used 2000 commuting data to assign 70 percent of the remaining counties and newspaper circulation to assign an additional 20 percent of the nation's counties. Of the remaining 154 counties unassigned after initial commuting and newspaper analysis, 57 were assigned by reevaluating commuting data and the remaining 97 allocated to form the least interconnected CEAs. A final analysis of county to CEA commuting flows was reiterated until all counties were assigned based on largest commuting flows. This objective was subservient to the requirement that all CEAs and EAs be geographically contiguous. The resulting 344 CEAs were then analyzed and aggregated to form EAs again using commuting flows and considering economic and geographic size. CEAs were combined if any area had an outcommuting rate that exceeded 8 percent or if a CEA had more than a 4 percent commuter flow to any other CEA. As a minimum threshold CEAs were aggregated if a CEA fell below any of the following three economic criteria: fewer than 50,000 employed residents, fewer than five counties and fewer than 250,000 employed residents, fewer than three counties and fewer than 500,000 employed residents. A few exceptions were allowed to the economic size thresholds if the geographic sizes of the CEAs were sufficiently large. CEAs were not merged if they met the following geographic exceptions: areas with at least 500,000 employed residents or at least 10 counties if net commuting was less than 1 percent. Areas that exceeded 10,000 square miles were also not merged if total outcommuting was 12 percent or less or if maximum commuting rate to another economic area was 6 percent or less.

Using the OMB's central and outlying designations, the central counties for all listed principal cities' statistical areas were designated as a core. This produced six regions (five in Appalachia and one in Oregon) that contained both metropolitan and micropolitan central status cores. In two of the five Appalachian regions the micropolitan central counties were not contiguous with the metropolitan central counties. We chose to add an additional constraint of metropolitan status to this analysis to produce more coherent central cores and surrounding peripheries. Micropolitan counties were not considered core counties if they were in an EA or CEA that contained a metro county. Linn County OR provided one exception; it is a micropolitan county that contains a city named in the CEA Albany-Corvallis-Lebanon. In this case, micropolitan Linn County had higher total employment (56,031) than metropolitan Benton County (55,534) and it did not seem reasonable to label Linn County as periphery. In a similar situation in Kentucky, micropolitan Sevier County had a named principal city, but a total employment of only 53,330 compared to 309,116 the core metro county (Knox County) in its EA. Because of this difference, micro Sevier County is not named a core county. In regions with only micropolitan counties, the central county or counties are considered core. Micropolitan Umatilla County OR, for example, is a core county because it is the central county with named principal cities in a region that has no metropolitan counties. All counties that are not core counties are considered periphery counties.

## **Appendix B: Descriptive analysis of trade flows and major exports in the seven smaller EAs, cores, and peripheries**

### **Central Appalachia**

#### **Lexington Economic Area**

The Lexington economic area (EA) is about half the size of the Nashville EA. This EA generated \$45 billion in commodity exports in 2007, sending 44 percent of its production outside the Central Appalachian region. The major commodity exports are stone, glass and masonry products (14 percent of exports), transportation equipment (12 percent), electrical machinery, equipment (6 percent), primary metals and foundries (5 percent) and fabricated metal products (5 percent).

The Lexington EA has relatively strong trade links with the rest of the CAP region. It sends 1 percent of production to each of the following EAs: Nashville, Knoxville and Charleston. Its import links are the strongest in Central Appalachia: it purchases 2 percent of its imports each from Nashville and Charleston, and 47 percent of the EA's imports come from outside Central Appalachia. The Lexington EA is more strongly tied to the other EAs in the region as it sources the lowest percentage of all imports internally. It balances inter-regional ties with a net deficit of \$15.7 billion in rest of the world trade. This deficit represents 16 percent of Lexington's total production the highest across all nine EAs in the study. Similarly sized Knoxville and Charleston EAs have deficits as a percent of total production of 3 percent and 8 percent respectively. The two small-medium sized economies of Eugene and Johnson City offer the closest comparison with an average net trade deficit of 13 percent of total production.

#### *Core*

The Lexington core economy accounts for less than one third of EA production. Lexington core exports are quite diversified, led by electrical machinery, equipment and appliances; (20 percent of the core's exports), nonelectric machinery and equipment (10 percent); legal, accounting and technical services (6 percent), wholesale trade (6 percent), and transportation equipment (5 percent). The core exports 7 percent of its production to the Lexington periphery and imports 3 percent of its inputs from the periphery. The Lexington core sends 1 percent of its production to the Charleston EA and 33 percent of its production outside the CAP region. The core imports 3 percent of its purchases from Charleston and 1 percent each from Knoxville and Nashville, and 38 percent from outside the CAP region.

#### *Periphery*

The Lexington periphery economy is concentrated in heavy industry. The leading export commodities are stone, glass and masonry products (17 percent of exports), transportation equipment (13 percent), primary metals and foundries (6 percent), and fabricated metal products (5 percent). Food manufacturing provides 4 percent of exports. Like other periphery regions, the Lexington periphery has weaker export links and stronger import links to the core than the core does to the periphery: the periphery exports 1 percent of

production to the core and imports 2 percent of its inputs from the core. It also exports 2 percent of production each to the Nashville and Charleston EAs, 1 percent each to the Knoxville and Johnson City EA and 43 percent to outside the region. Nashville, Knoxville, and Charleston each provide 2 percent of imports to the Lexington EA periphery; 1 percent of imports come from Johnson City and 50 percent from outside CAP.

### **Knoxville Economic Area**

The Knoxville EA is slightly smaller than the Lexington EA. The Knoxville EA exported \$30 billion in 2007, 36 percent of its production, outside the Central Appalachian region. The major commodity exports are transportation equipment (10 percent of the EA's exports), chemical products (9 percent), fabricated metal products (6 percent), primary metals and foundries (8 percent) and business services (6 percent).

The EA exports 2 percent of total production to Nashville and Lexington and 1 percent to Johnson City. The EA purchases 1 percent of commodity demand from Nashville, Lexington and Johnson City. By contrast, 39 percent of the EA's imports come from outside Central Appalachia.

Unexpectedly, given its relative size, Knoxville has trade surpluses with each of the other EAs in Central Appalachia, and a trade deficit with the rest of the world.

#### *Core*

The Knoxville core accounts for over half (58 percent) of the EA's production. Knoxville core exports are concentrated in heavy industry, led by primary metals and foundries (12 percent of the core's exports), business services (8 percent), transportation equipment (7 percent), chemical products (5 percent), and electric machinery, equipment and appliances (5 percent). The core exports 6 percent of its production to the Knoxville periphery and imports 3 percent of its inputs from the periphery. Linkages among the regions are quite weak: the Knoxville core sends 2 percent of its production to the Lexington EA, 1 percent each to Nashville and Johnson City, and 30 percent of its production outside the CAP region. The core imports 1 percent each from Nashville and Lexington, and 35 percent from outside the CAP region.

#### *Periphery*

The Knoxville periphery economy is concentrated in heavy industry. The three leading export commodities are fabricated metal products, chemical products, and transportation equipment (each of which with 13 percent of exports). Food manufacturing and business services contribute 5 percent each to exports. Like other peripheries, the Knoxville periphery has slightly weaker export links and slightly stronger import links to the core than the core does to the periphery: the periphery exports 3 percent of production to the core and imports 7 percent of its inputs from the core. It also exports 2 percent each to the Nashville, Lexington and Tri-City EAs and 43 percent to outside the region. Imports are purchased 2 percent from Nashville, 1 percent each from Lexington and Johnson City and 45 percent from outside CAP.



## **Charleston Economic Area**

The Charleston EA is about the same size as the Knoxville EA. The Charleston EA exported \$33 billion in 2007, 40 percent of its production, outside the Central Appalachian region. The major commodity exports are chemical products (21 percent of the EA's exports), primary metals and foundries (11 percent), coal mining (11 percent), petroleum products (8 percent) and transportation and warehousing services (5 percent).

As in the other CAP regions, the EA's trade links with the rest of the CAP region are relatively weak. The only EAs with which it trades more than one percent of production are Lexington (to which it exports 2 percent of production) and Nashville and Johnson City, to each of which it exports 1 percent of production. Its import links are even weaker, as no Central Appalachian EA provides more than 1 percent of Charleston's imports. Forty-five (45) percent of the EA's imports come from outside Central Appalachia.

Charleston has positive trade balances with the Nashville, Lexington and Johnson City EAs, a small negative trade balance with Knoxville, and a sizeable trade deficit with the rest of the world.

### *Core*

The Charleston core economy accounts for just over one-quarter of Charleston EA production. Charleston core exports are concentrated in heavy industry, resource extraction and related services. The leading export is chemical products (27 percent of total exports). Other leading export commodities are oil and gas extraction, (9 percent), transportation and warehouse services (7 percent) and coal mining (6 percent). The core exports 6 percent of its production to the Charleston periphery and imports 4 percent of its purchases from the periphery. Linkages among the regions are quite weak: the Charleston core sends 1 percent each of its production to the Nashville and Lexington EAs and 41 percent of its production outside the CAP region. The core imports 1 percent from the Nashville and Lexington EAs, and 39 percent from outside the CAP region.

### *Periphery*

The Charleston periphery economy is also concentrated in heavy industry, resource extraction and related services. The five leading export commodities are chemical products (19 percent of exports), primary metals and foundries (14 percent), coal mining (12 percent), petroleum products (10 percent) and transportation and warehousing services (4 percent). The periphery exports 1 percent of production to the core and imports 2 percent of its inputs from the core. The Charleston periphery also exports 3 percent of production to the Lexington EA, 1 percent each to the Nashville and Tri-City EAs and 41 percent to outside the region. One (1) percent of inputs are purchased from Lexington and Nashville and 47 percent from outside CAP.

## **Johnson City Economic Area**

The Johnson City EA is the smallest EA in Central Appalachia, about three-fifths the size of Charleston in terms of production. The Johnson City EA exported \$20 billion in 2007, 40

percent of its production, outside the Central Appalachian region. The major commodity exports are chemical products (19 percent of the EA's exports), coal mining (11 percent), nonelectric machinery and equipment (8 percent), electric machinery, equipment and appliances (6 percent) and rubber and plastics (6 percent).

Though the EA's trade links with the rest of the CAP region are relatively weak, the Johnson City EA exports 1 percent of its production to each of the other four EAs in the Central Appalachian region. The only Central Appalachian EA from which it buys more than 1 percent of its imports is Knoxville from whom it buys 2 percent of its purchases of inputs. Almost half (45 percent) of the EA's imports come from outside Central Appalachia.

The Johnson City EA has a small trade surplus with the Lexington EAs, but negative trade balances all the other CAP EAs and with the rest of the world.

### *Core*

Johnson City's core economy accounts for just under half (48 percent) of the EA's production. Almost half of all Johnson City's core exports are concentrated in three commodities: chemical products (33 percent of exports); electric machinery, equipment and appliances (8 percent); and transportation equipment (6 percent). Like other core regions, the core exports more (5 percent) of its production to the Johnson City periphery than it imports (3 percent of all purchases) from the periphery. It also exports 1 percent each of its production to the Nashville, Lexington and Knoxville EAs and 42 percent of its production outside the CAP region. The core imports 1 percent of imports each from Nashville and Knoxville, and 47 percent from outside the CAP region.

### *Periphery*

The Johnson City's periphery economy is concentrated in resource extraction and heavy industry. The five leading export commodities are coal mining (21 percent of exports), nonelectric machinery and equipment (11 percent), rubber and plastics (8 percent), fabricated metal products (7 percent) and chemical products (5 percent). Like the other periphery regions, the Johnson City periphery has slightly weaker export links and stronger import links to the core than the core does to the periphery: the periphery exports 3 percent of production to the core and imports 4 percent of its inputs from the core. It exports 1 percent of production to each of the Central Appalachian EAs and 38 percent to outside the region. It imports 2 percent of its inputs from Knoxville and 1 percent each of the other CAP EAs and 44 percent from outside Central Appalachia.

## **Oregon Region**

### **Eugene Economic Area**

The Eugene EA is about one-fifth the size of the Portland EA in terms of production, and more than twice the size of the other two EAs in Oregon combined. It ships 34 percent of production outside the Oregon region. Transportation equipment accounts for 17 percent of its exports outside of the region, followed by sawmills (6 percent), business services (5

percent), electric machinery (5 percent), chemical products (5 percent), and veneer and plywood (5 percent).

Eugene EA trade links with Portland are relatively strong. Eugene ships 8 percent of its production to Portland EA and imports 8 percent of its purchases. No other Oregon EA receives more than 1 percent of its exports.

Contrary to expectation, Eugene has the largest net trade deficit of any of the four Oregon EA regions, and is in a net deficit position with each of the other three OPNW regions, including the two smaller regions.

### *Core*

The Eugene core economy accounts for just less than half of EA production. Eugene core exports are led by transportation equipment (30 percent of the core's exports), electric machinery (6 percent), nonelectric machinery (5 percent), chemical products (5 percent) and sawmills (4 percent). The Eugene core exports 5 percent of its production to the Eugene periphery and imports 3 percent of its inputs from the periphery. It exports 14 percent of its production to the Portland EA and 35 percent of its production outside the Oregon region. The core imports 13 percent of its purchases from Portland EA, 1 percent from Bend EA and 44 percent from outside the Oregon region.

### *Periphery*

The Eugene periphery economy is relatively diversified with 7 percent of exports in non-recreation related retail and specializations in natural resource industries. The sectors with the highest total exports after retail are sawmills (7 percent of exports), construction (6 percent), business services (6 percent), logging (6 percent), and veneer and plywood (6 percent). The Eugene periphery exports 4 percent of production to the core (retail and construction were the leading sectors) and imports 4 percent of its inputs from the core. The Eugene periphery exports 2 percent to the Portland EA and 32 percent to outside the Oregon region. The Eugene periphery also imports 3 percent from the Portland EA and 37 percent from outside the Oregon region.

## **Bend Economic Area**

The Bend EA is about one-quarter the size of the Eugene EA in terms of production. It ships 34 percent of production outside the Oregon region. As befits a region that has undergone enormous growth during the past several decades, growth-related goods and services are major drivers of the economy. Wood windows and doors are the largest commodity export (accounting for 9 percent of exports). Other leading commodity exports are construction (8 percent), transportation equipment (7 percent), business services (6 percent), and real estate. (5 percent).

Bend EA trade links with other EAs are relatively weak, suggesting that the region's isolation dampens trade (It is the only Oregon region without access to an interstate highway). Bend ships 4 percent of its production to the Portland EA and 2 percent to Eugene, and imports 4 percent of its purchases from Portland and 1 percent from Eugene.

No other Oregon EA receives more than 1 percent of its exports or provides more than 1 percent in imports.

Bend EA has a positive trade surplus with Eugene and Pendleton and a trade deficit with Portland and the rest of the world.

#### *Core*

The Bend core economy accounts for 80 percent of Bend EA production. Bend core exports are led by construction (10 percent of exports), business services (7 percent), transportation equipment (7 percent), real estate (7 percent) and wooden windows and doors (5 percent). The core exports 8 percent of its production to the periphery and imports 5 percent of its inputs from the periphery. It also exports 3 percent to the Portland EA, 2 percent to the Eugene EA and 32 percent of its production outside the Oregon region. The core imports 4 and 1 percent of its purchases from the Portland and Eugene EAs respectively, and 37 percent from outside the Oregon region.

#### *Periphery*

The Bend periphery economy is heavily concentrated in natural resource industries. The five sectors with the highest total exports are wood windows and doors (21 percent of exports), crop farming (16 percent), animal farming (9 percent), wholesale trade (8 percent) and logging (7 percent). The periphery has relatively stronger links to the other regions: the periphery exports 21 percent of production to the core (construction and real estate were the leading sectors), 7 percent to the Portland EA and 1 percent each to the Eugene and Pendleton EAs and 41 percent outside the Oregon region.

### **Pendleton Economic Area**

The Pendleton EA is about two-thirds the size of the Bend EA in terms of production, and is specialized in farming, transportation and utilities. It ships 41 percent of production outside the Oregon region. Food manufacturing and crop farming are the leading commodity exports, accounting for 15 and 14 percent of total exports respectively. The region's other leading exports are transportation equipment (11 percent), transportation and warehousing (9 percent) and utilities (5 percent).

Pendleton EA trade links with the Portland EA and the rest of the world are relatively strong. Pendleton ships 8 percent of its production to Portland EA and 41 percent to the rest of the world. Pendleton imports 9 percent of its purchases from Portland EA, 1 percent from Bend EA and 43 percent from the rest of the world.

Pendleton has a net trade deficit with Portland EA, Bend EA and the rest of the world. Unexpectedly, given its small size, it has a small trade surplus with the Eugene EA.

#### *Core*

The Pendleton core economy is slightly smaller than the Pendleton periphery economy in terms of production. Pendleton core exports are led by food manufacturing (19 percent of exports). Transportation equipment, and transportation and warehousing account for 15

and 14 percent of exports, followed by crop farming (13 percent) and business services exports (10 percent). The core exports 2 percent of its production to the periphery and imports 1 percent of its purchases from the periphery. It exports 3 percent of its production to the Portland EA, 1 percent to the Eugene EA and 40 percent outside the Oregon region. The core 5 percent of its purchases from the Portland EA and 43 percent from outside the Oregon region.

### *Periphery*

The Pendleton periphery economy is dominated by agricultural industries. The sectors with the highest total exports are crop farming (15 percent of exports) and food manufacturing (14 percent). Utilities (8 percent), transportation equipment (8 percent) and sawmills (5 percent) are also leading industries. The periphery has strong links to the Portland EA: while the periphery exports only 1 percent of production to the Pendleton core, it exports 14 percent to the Portland EA. It also imports 13 percent of its inputs from Portland, 1 percent each from the Pendleton core and the Bend EA, and 43 percent from outside the Oregon region.

## **Appendix C: A description of the study area's largest traded commodities**

### **Natural Resource Based**

#### *The Coal Mining Industry*

Central Appalachia has long been characterized by the dominance of the coal mining industry. The Central Appalachian region in this analysis, by using BEA economic areas, incorporates many urban areas geographically outside of the predominately rural Central Appalachia. The inclusion of these urban areas diversifies the economic structure of the region and mutes coal's dominance. A brief examination of the trade flows for coal and related commodities includes the primary extraction commodities of coal mining, oil and gas extraction, and other mining. Two additional commodities, oil and gas mining services and other mining services provide the closest equivalent to value added commodity production. Coal, oil and gas commodities are used to power the production of a wide variety of other goods and the commodities do not have clearly defined byproducts.

The Central Appalachian region is a net exporter of coal and other mining and oil and gas extraction. Exports are led by coal mining, an industry which produced an estimated value of \$7.3 billion in total coal mining commodities and exported 92.1 percent of total production. Coal mining is the eleventh largest export for the CAP region. Within the region, it was the third largest export for the Charleston EA (11 percent of all exports) and the largest export for Johnson City (21 percent of all exports).

Coal is produced by the peripheries in the Charleston, Johnson City, and Lexington EAs. While little coal remains in the region, only 8 percent, one-half of what does is used by the producing CEAs. These coal producing peripheries have both the highest exports and imports of coal in the region. The Charleston EA produces 52 percent of all coal, primarily in its periphery regions. Charleston's CEA periphery leads by producing 45 percent of the EAs supply; the Beckley, West Virginia CEA core and periphery each contribute 17 percent to the EA; and the Charleston core produces another 14 percent. The Johnson City periphery is the single largest CEA producer and produces 31 percent of all CAP coal supplies.

Coal mining imports were 5 percent of total production or \$395 million. The region is a net importer of the other two primary commodities of other mining and oil and gas extraction. The second largest production occurred in oil and gas extraction which produced \$2.5 billion in total sales, of which \$1.7 billion was sent outside the region; however, the region is far from self sufficient with \$4.8 billion in total commodity imports. The region is also a net importer of other mining commodities, which was accounted for \$1.1 billion in total sales. Among mining's value added sectors, the region is a net exporter of coal mining services but a net importer of the other two services. The region produced \$6.8 billion in utility commodities, which includes the production of electricity from coal and hydroelectric dams. The region imported an additional \$5.4 billion in utility commodities.

### *The Agricultural Industry*

Oregon contains a diverse agricultural base, ranging from arid open range pastures used for livestock grazing in the southeast portions of the state to high value-added nursery production centered in the core counties of the state's major metropolitan area. Three of the top five counties with the highest agricultural sales are in the Portland EA, and two of these counties are a part of the Portland core. The state produces over 200 different agricultural commodities.

Crop farming; animal farming; and fishing, hunting, and agricultural services are the primary commodities of the agricultural industry. Food manufacturing commodities and textiles and apparel will be considered value added commodities. In addition, trade in recreational retail and scenic and sightseeing transportation offer some insight into which regions are profiting from scenic beauty. Scenic views and other amenities are sometimes enhanced by open space and other qualities of certain forms of agricultural land uses. Recreational related profits in Oregon can be attributed less to the agricultural industry alone than in other states that do not have the same amount of topographical diversity.

Agricultural production in the Oregon region is led by crop farming commodities production which with \$3.6 billion in sales is larger than animal farming and fishing, hunting and agricultural services combined. Seventy-three percent of crop farming commodities were exported. The supply of animal farming and fishing commodities within the region were relatively similar at \$1.0 and \$1.4 billion respectively. A higher share of fishing commodities is exported (49.3 percent) than animal farming commodities (39.8 percent). The region is a net importer of animal farming commodities importing 69 percent of the value of total supply in animal farming commodities, a share much higher than in the other two agricultural commodities.

Central Appalachia has a smaller agricultural industry producing \$2.1 billion in crop farming, \$2.4 billion in animal farming, and \$1.3 billion in fishing, hunting, and agricultural services.

The Oregon region imports and exports similar amounts of food manufacturing commodities with \$5.9 billion in total commodities moving in each direction. Nearly one-half of the region's \$10.8 billion in food manufacturing production is traded within the CEA in which it was produced. The region is a net importer of textile and apparel commodities, and total traded values are less than one-tenth the size of trade occurring in food manufacturing.

The Oregon region benefits from \$8.5 billion in recreational related retail trade while scenic and sightseeing transportation contributes \$0.9 billion in total production. The Central Appalachian region exports \$3.0 billion in recreation related retail or 19.1 percent of total production. Scenic and sightseeing transportation produced a total of \$8.5 million dollars of services.

### *The Timber Industry*

Timber production is an important natural resource economic base for the western half of the region. A majority (52.4 percent) of the logging industry's production stays within the Oregon region and is used for additional value added processing. The region is largely self-sufficient importing less than 1 percent of total logging production. The remaining logs leave the region bound largely for domestic exports. Even more so than coal, 79.5 percent of all the logs that stay within the region are used within the CEA in which they were produced. The Portland EA is the leading area in logging production, with the majority of all logging production coming from the Portland core, which extends into the state of Washington.

Among 12 forestry related economic sectors, including the two primary industries of logging and forest nurseries and 10 value-added sectors, the paper products sector produces the highest value of total production. The majority of paper product production originates in the Portland EA (the largest CEA producers are the Longview core, Portland core, Portland periphery, and Corvallis- Albany). Over three-fourths of all production from these areas is sold domestically. The logging sector provides the next highest value of production. Southwestern Oregon located in the Eugene EA has a large presence in veneer and plywood manufacturing among value added forestry products. Within every forestry sector, cores in the Oregon region have a higher total production value than peripheries.



Table 1 Characteristics of Study Regions.

	Rank among 179 BEA regions	Population (persons)	Production (\$million)	Per capita personal income (dollars)	Economic Base: Principal Export Industries of the EA [ <b>Bold =&gt;15%</b> ] [ <i>Italic=&gt;10%</i> ]
Portland, OR-WA	23 <sup>rd</sup>	2,972,184	245,308	34,910	<b>Electric Machinery</b>
Core		1,974,282	181,973	37,658	Food Manufacturing
Periphery		997,902	63,335	29,474	Paper Products
Nashville, TN	25 <sup>th</sup>	2,682,657	228,637	32,737	<i>Transportation equipment</i>
Core		1,085,994	122,081	40,829	Chemical products
Periphery		1,596,663	106,555	27,233	Food Manufacturing
Lexington, KY	58 <sup>th</sup>	1,494,007	95,145	26,553	<i>Stone, glass and masonry</i>
Core		275,199	27,813	37,775	<i>Transportation equipment</i>
Periphery		1,218,808	67,332	24,019	Electric Machinery
Knoxville, TN	65 <sup>th</sup>	1,164,006	83,617	29,025	<i>Transportation equipment</i>
Core		578,043	48,188	32,733	Chemical products
Periphery		585,963	35,429	25,368	Fabricated metal
Charleston, WV	68 <sup>th</sup>	1,187,000	84,198	27,727	<b>Chemical products</b>
Core		246,098	23,564	35,845	<i>Primary metals</i>
Periphery		940,902	60,634	25,604	<i>Coal mining</i>
Eugene-Springfield, OR	88 <sup>th</sup>	784,089	50,650	30,418	<b>Transportation equipment</b>
Core		339,422	24,803	31,364	Sawmills
Periphery		444,667	25,847	29,697	Business services
Johnson/Tri-Cities, TN-VA	90 <sup>th</sup>	741,115	51,269	26,972	<b>Chemical products</b>
Core		382,436	24,785	28,081	<i>Coal mining</i>
Periphery		358,679	26,484	25,790	<i>Nonelectric Machinery</i>
Bend-Prineville, OR	164 <sup>th</sup>	205,455	13,830	31,591	Wood windows and doors
Core		148,827	11,012	34,192	Construction
Periphery		56,628	2,818	24,754	Transportation Equipment
Pendleton-Hermiston, OR	176 <sup>th</sup>	141,504	8,497	25,596	<b>Food manufacturing</b>
Core		72,994	4,171	24,913	<i>Crop farming</i>
Periphery		68,510	4,326	26,325	<i>Transportation equipment</i>

Table 2A: The top three traded commodities\* in the cores and peripheries of Central Appalachia

Largest commodity export			Second largest commodity export			Third largest commodity export			
<b>Nashville</b>									
	% X	% of X		% X	% of X		% X	% of X	
EA	Transportation equipment	69%	14%	Chemical products	93%	8%	Food mfg	60%	6%
C	Health & social services	28%	9%	Business services	39%	8%	Transportation equipment	77%	8%
P	Transportation equipment	67%	20%	Chemical products	95%	10%	Food mfg	66%	7%
<b>Lexington</b>									
EA	Stone, glass & masonry products	95%	14%	Transportation equipment	70%	12%	Electric machinery, equipment & appliances	89%	6%
C	Electric machinery, equipment & appliances	93%	20%	Nonelectric machinery & equipment	85%	10%	Legal, accounting & technical services	33%	6%
P	Stone, glass & masonry products	95%	17%	Transportation equipment	69%	13%	Primary metals & foundaries	71%	6%
<b>Knoxville</b>									
EA	Transportation equipment	75%	10%	Chemical products	91%	9%	Fabricated metal products	89%	9%
C	Primary metals & foundaries	86%	12%	Business services	35%	8%	Transportation equipment	63%	7%
P	Fabricated metal products	93%	13%	Chemical products	95%	13%	Transportation equipment	83%	13%
<b>Charleston</b>									
EA	Chemical products	84%	21%	Primary metals & foundaries	80%	11%	Coal mining	94%	11%
C	Chemical products	77%	27%	Oil and gas extraction	77%	9%	Transportation & warehousing services	52%	7%
P	Chemical products	88%	19%	Primary metals & foundaries	79%	14%	Coal mining	94%	12%
<b>Tri-Cities</b>									
EA	Chemical products	99%	19%	Coal mining	96%	11%	Nonelectric machinery & equipment	84%	8%
C	Chemical products	99%	33%	Electric machinery, equipment & appliances	92%	8%	Transportation equipment	81%	6%
P	Coal mining	96%	21%	Nonelectric machinery & equipment	80%	11%	Rubber & plastics	89%	8%

\* Commodities are ranked as a share of total exports shown in the column labeled % of X. Data are also provided on what percent of each commodity's total production is exported (% X).

Source: Edited IMPLAN model Version 2.0 using 2007 data.

Table 2B: The top three traded commodities\* in the cores and peripheries of the Oregon Region

Largest commodity export			Second largest commodity export			Third largest commodity export		
<b>Portland</b>	% X	% of X		% X	% of X		% X	% of X
EA Electric machinery, equipment & appliances	85%	15%	Paper products	87%	7%	Food mfg	54%	6%
C Electric machinery, equipment & appliances	85%	19%	Business services	30%	7%	Wholesale trade	26%	6%
P Paper products	92%	17%	Food mfg	61%	12%	Primary metals & foundaries	81%	7%
<b>Eugene</b>								
EA Transportation equipment	82%	17%	Sawmills and wood preservation	80%	6%	Business services	30%	5%
C Transportation equipment	81%	30%	Electric machinery, equipment & appliances	93%	6%	Nonelectric machinery & equipment	80%	5%
P Retail: nonrecreation-related	40%	7%	Sawmills and wood preservation	79%	7%	Construction	19%	6%
<b>Bend</b>								
EA Wood windows and doors and millwork	86%	9%	Construction	21%	8%	Transportation equipment	87%	7%
C Construction	23%	10%	Business services	42%	7%	Transportation equipment	86%	7%
P Wood windows and doors and millwork	86%	21%	Crop farming	86%	16%	Animal farming	76%	9%
<b>Pendleton</b>								
EA Food mfg	71%	15%	Crop farming	78%	14%	Transportation equipment	87%	11%
C Food mfg	75%	19%	Transportation equipment	84%	15%	Transportation & warehousing services	58%	14%
P Crop farming	78%	15%	Food mfg	64%	11%	Utilities	52%	8%

\* Commodities are ranked as a share of total exports shown in the column labeled % of X. Data are also provided on what percent of each commodity's total production is exported (% X).

Source: Edited IMPLAN model Version 2.0 using 2007 data.

Table 3A: Exports between EA regions in Central Appalachia

Destination	Exporting Economy				
	Nashville	Lexington	Knoxville	Charleston	Johnson City
Nashville	58%	2%	1%	1%	1%
Lexington	1%	48%	1%	1%	1%
Knoxville	1%	1%	57%		2%
Charleston		2%		52%	1%
Johnson City					51%
Domestic/ Foreign	40%	47%	39%	45%	45%
Total	98%	98%	97%	97%	98%
Production	228,637	95,145	83,617	84,198	51,269

Table 3B: Exports between EA regions in Oregon

Destination	Exporting Economy			
	Portland	Eugene	Bend	Pendleton
Portland	66%	8%	6%	10%
Eugene	2%	51%		
Bend			56%	
Pendleton				46%
Domestic/ Foreign	32%	40%	37%	43%
Total	99%	99%	99%	99%
Production	245,308	50,650	13,830	8,497

Table 4A: Imports between EA regions in Central Appalachia

Source	Importing Economy				
	Nashville	Lexington	Knoxville	Charleston	Johnson City
Nashville	62%	1%		1%	1%
Lexington	1%	55%	2%	2%	1%
Knoxville	1%	1%	59%		1%
Charleston		1%		56%	1%
Johnson City			1%	1%	57%
Domestic/ Foreign	36%	40%	36%	40%	40%
Total	100%	100%	98%	100%	100%
Demand	243,420	110,840	86,209	90,852	57,460

Table 4B: Imports between EA regions in Oregon

Source	Importing Economy			
	Portland	Eugene	Bend	Pendleton
Portland	66%	8%	4%	9%
Eugene	2%	58%	2%	
Bend			59%	
Pendleton				50%
Domestic/ Foreign	32%	34%	34%	41%
Total	100%	100%	100%	100%
Demand	245,885	57,519	14,678	9,173

Table 5A: Central Appalachian exports by EA core and peripheries, in percents

	Nashville			Lexington			Knoxville			Charleston			Johnson City		
	EA	C	P	EA	C	P	EA	C	P	EA	C	P	EA	C	P
Nashville	62.1			1		2	2	1	2	1	1	1	1	1	1
C		57	3				1		1						
P		8	55	1		1	1	1	2	1	1	1			1
Lexington	1	1	1	55			2	2	2	2	1	3	1	1	1
C					58	1				1		1			
P	1	1	1		7	50	2	1	2	2	1	2	1	1	1
Knoxville	1		1	1		1	59						1	1	1
C								60	3						
P				1		1		6	47				1	1	1
Charleston				1	1	2				56			1		1
C											56	1			
P				1		1					6	53	1		1
Johnson City						1	1	1	2	1		1	57		
C									1					51	3
P							1	1	1			1		5	54
ROW	36%	33.3	39.2	40.5	33.5	43.3	35.9	30.3	43.5	39.8	36	41.2	39.9	41.6	38.3
	99%	99	98	99	98	98	99	99	99	99	99	100	99	99	99
Total Production	228,637	122,081	106,555	95,145	27,813	67,332	83,617	48,188	67,332	84,198	23,564	60,634	51,269	24,785	26,484

Table 5B: Central Appalachian imports by EA core and peripheries, in percents

	Nashville			Lexington			Knoxville			Charleston			Johnson City		
	EA	C	P	EA	C	P	EA	C	P	EA	C	P	EA	C	P
Nashville	58.3			2	1	2	1	1	2	1	1	1	1	1	1
C		60	8	1		1	1	1	1						
P		3	46	1	1	1	1	1	1	1		1	1		1
Lexington	1		1	48			1	1	1	1	1	1	1		1
C					56	2									
P					3	41	1	1	1	1	1	1	1		1
Knoxville	1		1	1	1	2	57						2	1	2
C				1		1		60	7				1	1	1
P				1		1		3	43				1	1	1
Charleston				2	2	2				52			1		1
C											55	2			
P				2	1	2					4	48	1		1
Johnson City						1	1		1				51		
C														47	4
P									1					3	47
ROW	40%	35.7	44.2	46.8	37.9	49.9	39.5	34.8	45.3	45.2	39.3	47.3	45.2	46.6	44
	98%	99	99	99	99	99	99	99	99	99	99	99	100	99	99
Total Demand	243,420	115,823	127,596	110,840	28,689	82,151	86,208	47,903	38,305	90,851	23,855	66,996	57,460	26,671	30,789

Table 6A: Oregon exports by EA core and periphery, in percents

EA	Portland			Eugene			Bend			Pendleton		
	EA	C	P	EA	C	P	EA	C	P	EA	C	P
Portland	<b>66</b>			8	14	2	4	3	7	9	3	14
C		<b>63</b>	8	2	3	1	2	1	3	7	2	12
P		4	<b>53</b>	6	11	1	2	2	4	2	1	2
Eugene	2	1	4	<b>58</b>			2	2	1		1	
C	2	1	4		<b>45</b>	4	2	2				
P					5	<b>62</b>						
Bend							<b>59</b>					
C								<b>54</b>	21			
P								8	<b>29</b>			
Pendleton									1	<b>50</b>		
C											<b>54</b>	1
P									1		2	<b>43</b>
Domestic/F oreign	32	31	34	34	35	32	34	32	41	41	40	42
Total Production	245,308	181,973	63,335	50,650	24,803	25,847	13,830	11,012	2,818	8,497	4,171	4,326

Table 6B: Oregon imports by EA core and periphery, in percents

EA	Portland			Eugene			Bend			Pendleton		
	EA	C	P	EA	C	P	EA	C	P	EA	C	P
Portland	<b>66</b>			8	13	3	6	4	10	10	5	14
C		<b>65</b>	11	3	5	2	4	3	6	9	4	13
P		3	<b>48</b>	5	8	1	2	1	4	1	1	1
Eugene	2	1	4	<b>51</b>			1	1	1			
C	1		4		<b>39</b>	4	1	1				
P					3	<b>56</b>						
Bend					1		<b>56</b>			1		1
C					1			<b>52</b>	26	1		1
P								5	<b>26</b>			
Pendleton										<b>46</b>		
C											<b>50</b>	1
P											1	<b>40</b>
Domestic/F oreign	32	31	36	40	44	37	37	37	38	43	43	43
Total Imports	245,885	175,718	70,168	57,519	28,711	28,808	14,678	11,456	3,222	9,173	4,521	4,652

Table 7: Core Trade Surplus with Periphery

EA Region (ranked by size)	Core Trade Surplus with Periphery (\$million)	Trade Surplus as % of Economic Area Production
Portland, OR-WA	3,004	1.2
Nashville-, TN	6,390	2.8
Lexington, KY	1,196	1.3
Knoxville, TN	1,520	1.8
Charleston, WV	549	0.7
Eugene-Springfield OR	262	0.5
Johnson/Tri-Cities TN-VA	375	0.7
Bend-Prineville, OR	230	1.7
Pendleton-Hermiston, OR	20	0.2

Table 8: Current account balance estimates

	Net trade balance (\$million)	Dividends, Interest, Rent (DIR) (\$million)	Transfer Payments (TP) (\$million)	Federal Taxes (FT) (\$million)	Current Account Balance (Net Trade + DIR + TP - FT) (\$million)	Total Production (\$million)	Net Trade as % of Producti on	Current Account Balance as % of Production
Portland, OR-WA	-577	19,202	14,159	17,494	15,290	245,308	-0.2	6.2
Core	6,255	13,648	8,742	13,085	15,560	181,973	3.4	8.6
Periphery	-6,832	5,554	5,418	4,409	-269	63,335	-10.8	-0.4
Nashville-, TN	-14,783	10,368	13,639	14,781	-5,557	228,637	-6.5	-2.4
Core	6,258	5,546	4,975	8,300	8,479	122,081	5.1	6.9
Periphery	<b>-21,041</b>	4,822	8,665	6,481	-14,035	106,555	-19.7	-13.2
Lexington, KY	-15,695	5,216	9,289	5,919	-7,109	95,145	-16.5	-7.5
Core	-876	2,034	1,213	1,897	474	27,813	-3.1	1.7
Periphery	<b>-14,819</b>	3,183	8,076	4,022	-7,582	67,332	-22.0	-11.3
Knoxville, TN	-2,591	4,321	6,768	5,590	2,908	83,617	-3.1	3.5
Core	285	2,626	2,981	3,453	2,439	48,188	0.6	5.1
Periphery	-2,876	1,695	3,787	2,136	470	35,429	-8.1	1.3
Charleston, WV	-6,653	3,916	8,843	4,748	1,358	84,198	-7.9	1.6
Core	-291	1,238	1,812	1,423	1,336	23,564	-1.2	5.7
Periphery	-6,362	2,677	7,031	3,325	21	60,634	-10.5	0.0
Eugene, OR	-6,869	5,489	4,740	3,544	-184	50,650	-13.6	-0.4
Core	-3,908	2,450	1,844	1,633	-1,247	24,803	-15.8	-5.0
Periphery	-2,961	3,040	2,896	1,912	1,063	25,847	-11.5	4.1
Johnson/Tri- Cities, TN-VA	-6,191	2,516	5,504	2,840	-1,011	51,269	-12.1	-2.0
Core	-1,886	1,450	2,394	1,660	298	24,785	-7.6	1.2
Periphery	-4,305	1,066	3,110	1,180	-1,309	26,484	-16.3	-4.9
Bend, OR	-1,782	1,564	1,039	1,001	-180	13,830	-12.9	-1.3
Core	-1,378	1,267	704	799	-206	11,012	-12.5	-1.9
Periphery	-404	297	335	202	26	2,818	-14.3	0.9
Pendleton, OR	-676	643	808	536	239	8,497	-8.0	2.8
Core	-349	280	380	270	41	4,171	-8.4	1.0
Periphery	-327	363	428	266	198	4,326	-7.6	4.6
Regional averages (Weighted)								
OR	-2,476	6,725	5,187	5,644	3,791	79,571	-3.1	4.8
OR-C	155	4,411	2,918	3,947	3,537	55,490	0.3	6.4
OR-P	-2,631	2,314	2,269	1,697	255	24,082	-10.9	1.1
AP	-9,183	5,267	8,809	6,776	-1,882	108,573	-8.5	-1.7
AP-C	698	2,579	2,675	3,347	2,605	49,286	1.4	5.3
AP_P	-9,881	2,689	6,134	3,429	-4,487	59,287	-16.7	-7.6



Table 9: Regional account balance components: Per capita payments and shares of income

	Population (persons)	Personal Income (\$million)	DIR* per capita	DIR as % Personal Income	TPs** per capita	TPs as % Personal Income	Federal Taxes per capita	Federal Taxes as % Personal Income	Net Federal Impact: TP minus taxes per capita	Net Federal Impact: TP minus taxes as % of PI
Portland, OR-WA	2,972,184	103,759	6,461	18.5%	4,764	13.6%	5,886	16.9%	-1,122	-3.2%
Core	1,974,282	74,348	6,913	18.4%	4,428	11.8%	6,628	17.6%	-2,200	-5.8%
Periphery	997,902	29,412	5,566	18.9%	5,429	18.4%	4,418	15.0%	1,011	3.4%
Nashville-, TN	2,682,657	87,822	3,865	11.8%	5,084	15.5%	5,510	16.8%	-426	-1.3%
Core	1,085,994	44,340	5,107	12.5%	4,581	11.2%	7,643	18.7%	-3,062	-7.5%
Periphery	1,596,663	43,482	3,020	11.1%	5,427	19.9%	4,059	14.9%	1,368	5.0%
Lexington, KY	1,494,007	39,670	3,491	13.1%	6,218	23.4%	3,962	14.9%	2,256	8.5%
Core	275,199	10,396	7,391	19.6%	4,408	11.7%	6,894	18.2%	-2,486	-6.6%
Periphery	1,218,808	29,275	2,612	10.9%	6,626	27.6%	3,300	13.7%	3,326	13.8%
Knoxville, TN	1,164,006	33,785	3,712	12.8%	5,814	20.0%	4,802	16.5%	1,012	3.5%
Core	578,043	18,921	4,543	13.9%	5,157	15.8%	5,974	18.3%	-817	-2.5%
Periphery	585,963	14,865	2,893	11.4%	6,463	25.5%	3,646	14.4%	2,817	11.1%
Charleston, WV	1,187,000	32,912	3,299	11.9%	7,450	26.9%	4,000	14.4%	3,449	12.4%
Core	246,098	8,821	5,031	14.0%	7,363	20.5%	5,782	16.1%	1,581	4.4%
Periphery	940,902	24,091	2,845	11.1%	7,473	29.2%	3,534	13.8%	3,938	15.4%
Eugene-Springfield, OR	784,089	23,850	7,000	23.0%	6,045	19.9%	4,520	14.9%	1,525	5.0%
Core	339,422	10,646	7,218	23.0%	5,433	17.3%	4,810	15.3%	622	2.0%
Periphery	444,667	13,205	6,837	23.0%	6,513	21.9%	4,299	14.5%	2,214	7.5%
Johnson/Tri-Cities, TN-VA	741,115	19,989	3,395	12.6%	7,427	27.5%	3,832	14.2%	3,594	13.3%
Core	382,436	10,739	3,791	13.5%	6,260	22.3%	4,342	15.5%	1,918	6.8%
Periphery	358,679	9,250	2,972	11.5%	8,671	33.6%	3,290	12.8%	5,381	20.9%
Bend-Prineville, OR	205,455	6,491	7,612	24.1%	5,057	16.0%	4,870	15.4%	187	0.6%
Core	148,827	5,089	8,513	24.9%	4,730	13.8%	5,366	15.7%	-635	-1.9%
Periphery	56,628	1,402	5,245	21.2%	5,916	23.9%	3,567	14.4%	2,349	9.5%
Pendleton-Hermiston, OR	141,504	3,622	4,544	17.8%	5,710	22.3%	3,785	14.8%	1,925	7.5%
Core	72,994	1,818	3,836	15.4%	5,206	20.9%	3,697	14.8%	1,509	6.1%
Periphery	68,510	1,804	5,298	20.1%	6,247	23.7%	3,879	14.7%	2,368	9.0%

Table 9: Regional account balance components: Per capita payments and shares of income - cont.

Regional Averages	Population (persons)	Personal Income (\$million)	DIR per capita	DIR as % Personal Income	TPs per capita	TPs as % Personal Income	Federal Taxes per capita	Federal Taxes as % Personal Income	Net Federal Impact: TP minus taxes per capita	Net Federal Impact: TP minus taxes as % of PI
OR	1,025,808	34,430	6,555	19.5	5,056	15.1	5,203	16.4	-147	-1.3%
OR-C	633,881	22,975	6,959	19.2	4,603	12.7	6,670	17.2	-2,068	-4.5%
OR-P	391,927	11,456	5,903	20.2	5,790	19.8	3,914	14.8	1,876	5.0%
AP	1,453,757	42,836	3,623	12.3	6,059	20.6	4,661	15.8	1,398	4.7%
AP-C	513,554	18,643	5,021	13.8	5,209	14.3	6,517	18.0	-1,308	-3.6%
AP_P	940,203	24,192	2,860	11.1	6,524	25.4	3,647	14.2	2,877	11.2%

\* Dividends, interest, and rent (DIR) from the Bureau of Economic Analysis' Local Area Personal Income and Employment estimates, Table CA-05, 2007.

\*\*Transfer payments (TP) data is also collected from the BEA's Local Area Income and Employment estimates, Table CA-35, 2007.

Federal Tax data are from the Tax Foundation's Federal Tax Burden by County, Congressional District, and Major City Area, see <http://www.taxfoundation.org/blog/show/2279.html>.