A consumption-based view of the standard of living in the Dutch Republic

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This paper is based on a chapter of a book. It makes reference to findings presented in earlier chapter of the book which, for the purposes of this seminar, the reader must accept on faith. I will summarize the most important of these findings at the beginning of the seminar.

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Introduction.

The conventional approach to measuring the standard of living – the income-based approach – begins by measuring earnings and continues by deflating earnings by prices. Daily wage rates usually represent earnings, while prices are represented by a form of consumer price index, which can be as simple as the price of grain, thought to be the largest single expenditure, or as complex as a weighted average of a broad range of consumer goods and other living costs. This paper begins by using this approach to compare living standards in the western and eastern Netherlands. The results of this inquiry raise questions about the adequacy of the conventional income-based approach, which I pursue in the paper's second half by exploring an alternative, consumption-based approach. The paper concludes by assessing the plausibility of the consumption-based findings.

Wage rates.

Nominal wages were remarkably uniform throughout Holland and neighboring Zeeland. There was no consistent difference between the wage rates paid in large cities vs small, or even between urban vs rural locations, and this uniformity continued into the nineteenth century.[1] Thus, the wages cited for "Holland" apply to far more than just Amsterdam, the largest city. In fact wage quotations for Amsterdam were not always the highest found in any given year. Matters were far different in large cities cities such as London and Paris, where nominal wages fell off sharply within sight of the cities' spires.

The eastern and northern provinces always revealed somewhat greater heterogeneity in their labor markets. Wages were usually higher in Friesland and Groningen than in the eastern provinces, and rural wages in the east (for which evidence is sparse) may have been significantly lower than in the eastern towns. But within this variation one finds a consistent and distinctive pattern: wages in this region were always distinctly lower than in the west. Figures 12.1-2 summarize the average daily wage rates for both regions for six types of construction labor for the period 1550-1820.
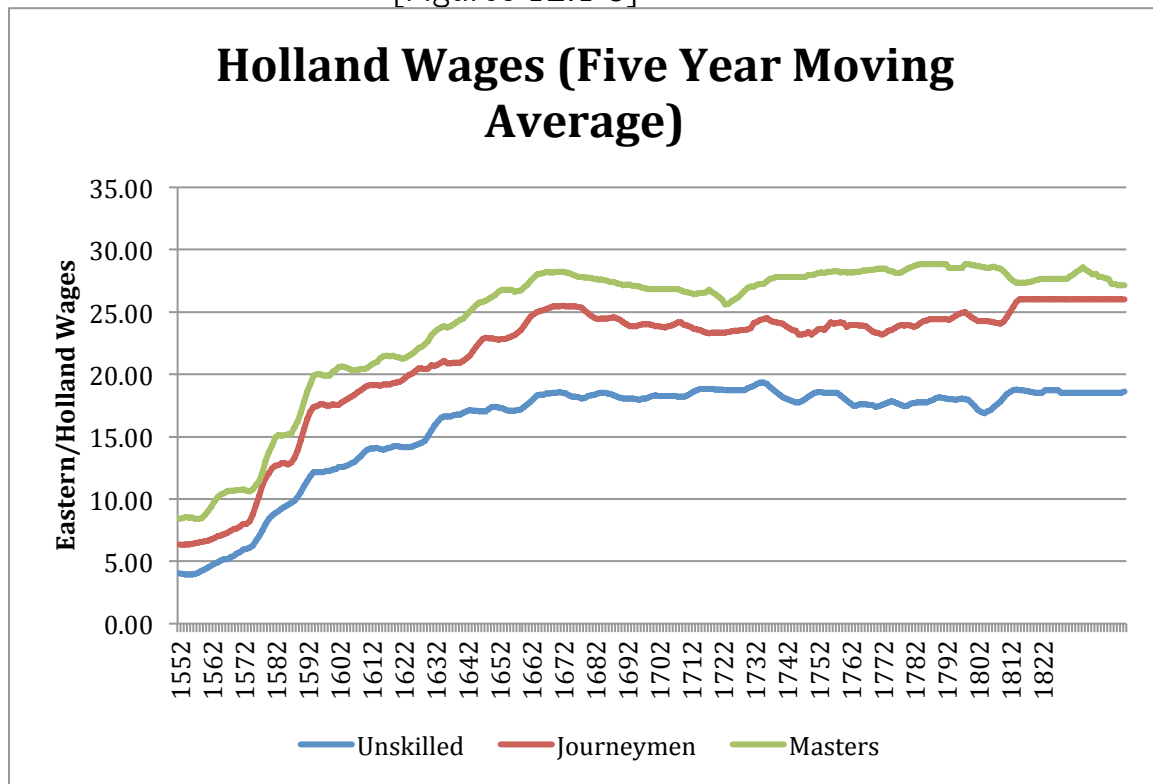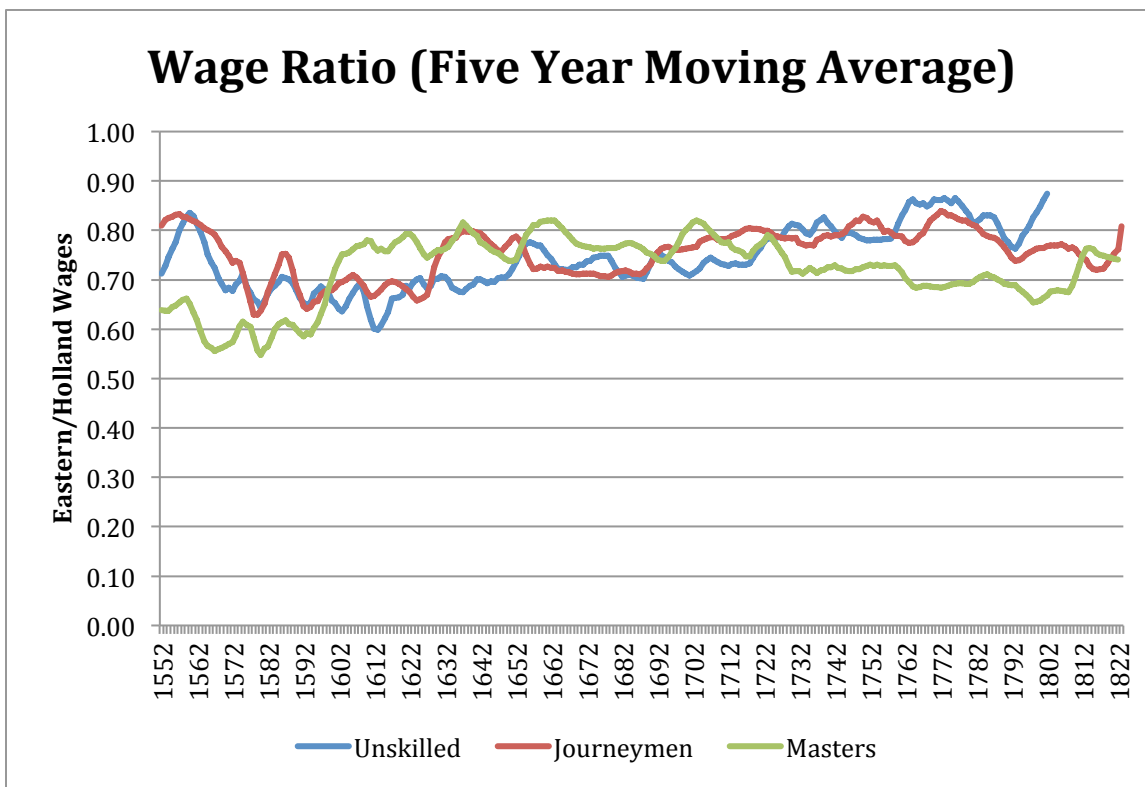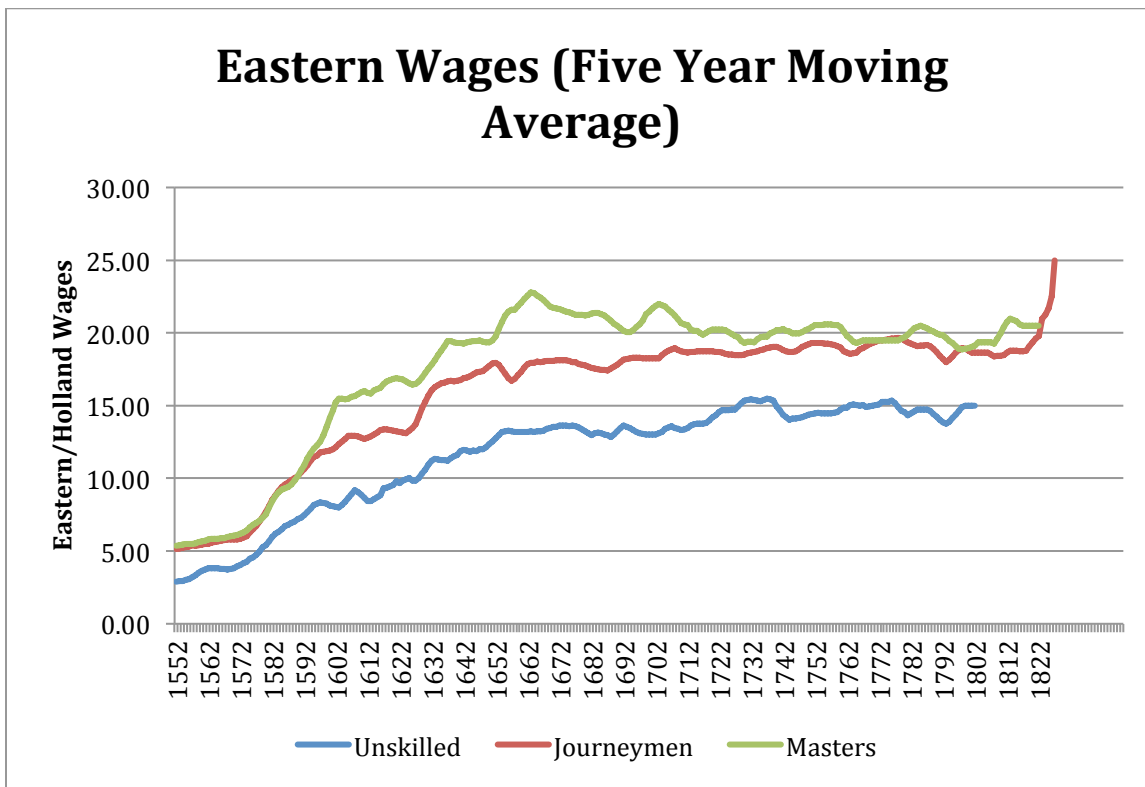
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[1] Jan de Vries, "The Labour Market," Economic and Social History in the Netherlands 4 (1992), 55-78.

Figure 12.3 shows eastern wages as a percentage of wages in the west. A substantial nominal wage gap is present already in the 1550s and persisted nearly 300 years later.

But by the 1550s eastern wages were only about 75 percent of those in Holland, and that gap increased in the turbulent decades of the Revolt. Eastern wages reached a low point in the period 1580-99, when they were only two-thirds the level of now vigorously growing Holland.

[Figures 12.1-3]

Holland Wages (Five Year Moving Average)

Eastern Wages (Five Year Moving Average)

Legend: Unskilled — Journeymen — Masters

Wage Ratio (Five Year Moving Average)

Legend: Unskilled — Journeymen — Masters

Most of the "peripheral" provinces of the Netherlands were densely seeded with towns, which, in turn, were well connected to the larger commercial centers of Holland. Goods flowed between them at low cost resulting in a well-integrated market for, among other things, the bread grains. The eastern towns acquired these grains at prices very similar to those prevailing in Holland. In a conventional analysis of the purchasing power of labor it must follow that wage laborers in the eastern Netherlands were, and remained, significantly less well off than their counterparts in Holland: they earned 66 to 75 percent of the western wage, but faced equal grain cost, which determined the largest single expenditure of working households. Their other commodity costs (peat, dairy products, meat, clothing) were also likely to be approximately equal to those in Holland leaving only housing and local services as items of expenditure on which they might hope to pay significantly less.

The commodity market integration of east and west had its counterpart in labor market integration. Workers in the east could migrate to the towns of Holland to capture the higher wages on offer there, and we know that they did so in large numbers. Holland's port cities recruited labor from an international zone that extended from the Republic's northern provinces to embrace the German North Sea coast and the Scandinavian lands; the industrial cities were first the refuge of Flemish textile workers and later the destination of craftsmen from Liège and the Rhineland and builders and artisans from the eastern provinces and Westphalia; Holland's hay meadows, linen bleaching fields, brick yards and harvest fields attracted tramping seasonal agricultural and industrial workers from a zone stretching from the eastern provinces deep into the north German plain.[2]

An ongoing flow of migrant labor from east to west played a critical role in keeping the towns of Holland supplied with artisans and servants and the merchant marine and fishing and whaling fleets supplied with crews. But this ongoing movement of labor did not fully erode the nominal wage gap, which remained nearly as large in 1820 as it had been in 1550. In a conventional model of labor supply and demand one would expect that the regular movement of workers from low-wage A to high-wage B would, over time, cause labor to become more scarce in A and more abundant in B, reducing the wage gap until some equilibrium is reached between the

[2] Christiaan van Bochove, The economic consequences of the Dutch. Economic Integration around the North Sea, 1500-1800 (Amsterdam, Askant, 2008); Jelle van Lottum, Across the North Sea. The Influence of the Dutch Republic on International Labour Migration (Amsterdam, Askant, 2007), Ch. 1.

two labor markets.[3] Perhaps no such adjustment occurred here because the migrants' destinations, primarily the cities and ports of Holland and Zeeland, were "urban graveyards", places whose high mortality (whether in the cities themselves or on board the ships that sailed from many of them) prevented the migrant streams from being translated into later population growth via natural increase.[4] If the labor demand in the western cities persisted despite ongoing migration, there is no reason for the gap in nominal wages to diminish; the same would be expected if the supply of lower wage labor were literally "unlimited" in the large international zone from which it was recruited.[5]

Real wages

The nominal wage gap persisted, but what about the real wage, the purchasing power of labor? Did a gap in the real wage also persist throughout this period?   I asserted above that the integrated commodity markets of the Netherlands would suggest that the gap in nominal wages (eastern wages were 67 percent of western wages in 1580-1619) should translate into a purchasing power gap nearly as large. An examination of bread prices in the first years of the seventeenth century confirms this expectation.

Our best evidence in the first years of new system bread prices comes from Leiden and Haarlem in Holland and Kampen and Deventer in Overijssel. The two Holland cities were large and growing rapidly in 1600 while the two eastern towns on the IJssel River were then neither large nor particularly prosperous. But their bread price commissioners faced similar grain prices (eastern rye then cost about five percent more than in Holland) and they assessed the constant costs faced by their bakers to be much the same.[6] It follows, then, that the price of rye bread should also be similar. Kampen's prices for these years have not survived but those of Deventer have, and they show that Leiden's rye bread prices – where bakers in these years must have paid much more for rent and labor than in the IJssel

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[3] Such a model is applied to the intercontinental migration of the nineteenth century to assess the impact of mass migration on wages in Europe and North America. See Tim Hatton and Jeffrey G. Williamson, "What Drove the Mass Migrations from Europe in the Late Nineteenth Century?" Population and Development Review, 20 (1994), 1-27.

[4] Jan de Vries, "Urban Historical Demography: graveyards, migrants, and the demographic transition," (Cambridge Group Fiftieth Anniversary Conference, unpublished paper, 2014).

[5] W. Arthur Lewis, "Economic Development with Unlimited Supplies of Labor,"Manchester School of Economic and Social Studies, Vol. 22 (1954), 139-91.

[6] Leiden's 1596 baking trials led the commissioners to set constant costs for the baking of last of rye at 41.28 guilders, which they raised in small steps to 44.35 guilders by 1599. In 1600, Kampen's commissioners set their constant costs at 40.50 guilders.

towns – were only 6.8 percent higher than Deventer's from 1596 through 1604. (1.376 stuivers per kg. in Leiden, 1.289 stuivers in Deventer).

The similarity observed around 1600 is likely to reflect a pattern of long standing. Bread prices were rarely recorded before the introduction of new system regulation, so we do not know with certainty how prices compared between east and west before 1596. But, since old system pricing closely tracked the grain price, and our evidence points to the widespread use of a pound-of-bread per pound-of-grain criterion for determining the expected bread yield, it is very likely that rye bread prices in Holland and Overijssel had not differed by much under the old system.

Bread was relatively costlier for eastern wage earners than for those in Holland, and their relative disadvantage only grew between 1550 and 1596 as nominal wages in Holland rose more rapidly than in the eastern towns. In the 1550s, a decade with several severe food crises, unskilled wage earners needed to spend 47 percent of their day wage to supply their family with 2.2 kilograms of rye bread, while eastern wage earners had to part with 62 percent. Workers in both regions became significantly better off by the 1580s, but eastern wage earners still spent 40-50 percent more of their income than workers in Holland in order to secure the same amount of bread.

In the first years of new-system bread pricing this relationship persisted, but matters soon changed fundamentally. The "new system" provided magistrates with opportunities to determine both the level and the distribution of non-grain costs to be incorporated in the bread prices prevailing in their towns and districts. They had a new policy tool at their disposal, and it soon became apparent that the policy objectives in the maritime west differed significantly from those in the inland eastern provinces. Via provincial tax policies and municipal policies in setting the returns to millers and bakers, the *broodzetting* soon confronted consumers with regionally distinct absolute and relative prices.

Table 12.4 shows the details of the unfolding regional divergence. The first two columns reveal the extent to which rye bread came to be burdened with costs that exceed the norm prevailing before the introduction of the new system, which was that the price of a kilogram of bread should equal the price of a kilogram of grain. As additional constant costs (that is, non-grain costs such as taxes, labor, capital, fuel) come to be added to the price of bread, this ratio rises above 1.00. In Holland and her western neighbors the ratio rises rapidly and continuously, exceeding 1.5 by 1680. Thereafter it rises and falls primarily with changes in the grain price (the denominator of the ratio). In the east policy makers

sheltered rye bread from these cost and tax increases, and the ratio rises only slightly above 1.00.

Rye bread came to sell at much lower prices in the eastern provinces, and the consequences for the purchasing power of unskilled workers is revealed in columns 3, 4, and 5 of the table. There we draw upon the analysis of workers' ability to afford a supply of 2.2 kilograms of bread per day discussed in Ch. 4. The method used was to assume that 250 days of annual labor at the unskilled worker's summer day wage constituted the family's annual income and then to measure how much of that income was needed to buy 2.2 kilograms of bread per day, month-by-month. Here, only the annual percentages are used, grouped into 20-year averages.

[Table 12.4. Indicators of purchasing power.]

In the long run, such families became better off in both regions throughout the seventeenth century until they attained a peak of bread-purchasing power in the period 1720-39. But, while the bread purchasing power of unskilled workers improved in both regions, those of the east improved faster. In 1596-1619 western workers spent only 75 percent as much of their earnings on bread as eastern works (the same advantage they had enjoyed fifty years earlier), but by the 1660s their rye bread had become relatively more expensive. Their higher nominal wages no longer translated into a higher bread purchasing power, and by 1700 it was the eastern workers who could more easily afford to supply their families with rye bread. Their nominal wages remained only 75 percent of the unskilled wage in Holland, but their "rye wage" was now 143 percent of that in the west!

The Dutch Republic's standard of living gap – its internal "little divergence", if you will – was clearly in evidence around 1600. Did it dissolve in the course of later decades, such that living standards were no higher in Golden Age Holland than in the quiet provincial towns and villages of the inland provinces? If so, what motivated those many migrants who continued to tramp westward in search of a better life? Were they destined for places where their higher nominal earnings would be taxed away by the state and appropriated by the bakers, both aided and abetted by the policies of bread price commissioners, those ostensible protectors of the interests of the common man?[7]

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[7] Van Zanden, "Kosten van levensonderhoud," p. 315; "Deze ontwikkelingen zijn opmerkelijk…De arbeiders in het rijke Holland lijken er in ider geval tot 1750 slechter voor te staan dan de arbeiders in her arme Overijssel. Van Zanden, Arbeid tijdens het handelskapitalisme, p. 145.

On the face of things, nominal wages were at least 33 percent higher in Holland than in the eastern provinces while grain prices were equal in the two regions. In the sixteenth century Hollanders enjoyed the benefit of their higher wages in higher real earnings: They could consume more bread, better bread, more of other goods, or some combination of all three. But by the mid seventeenth century, during the boom times of the golden age, Hollanders appear to have lost this advantage. Under the new regulatory system rye bread prices rose faster in Holland than in the east, resulting, ultimately, in the disappearance of the benefit conferred by the western region's higher nominal wage. For wage-earning Hollanders, this appears to have been a time of "relative deprivation": their overall real wage increased in the long run, but it fell behind the real wage rise in the eastern provinces, which experienced no comparable economic transformation. This was certainly a perverse Golden Age.

Can we improve on these measurements of the standard of living ?

Most studies of real wages in pre-industrial societies stop at this point, but it is the wrong place to stop, certainly if our interest is the standard of living rather than simply the purchasing power of the reward for a day's work. The wage rate is not the same thing as household income, since it takes no account of un- and underemployment or the earnings of other family members. Nor, of course, is a quantity of grain, or even an amount of rye bread, the full measure of consumption. We are not now able to estimate household incomes directly with any accuracy. It would be interesting to know, for instance, whether wage earners in Holland could expect full employment, say 300 days per year, while those in the east were fortunate to find 200 days of work. Likewise, one would like to know if the monetary earnings of women and children were significantly higher in Holland than in the east.

We can, to be sure, calculate (adult male) purchasing power via a full basket of consumables rather than rely only on a grain or bread standard, but at present we can do this only for Holland, since separate price series for most non-bread expenditures are not available for the eastern provinces.[8]

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[8] Cost of living indexes, or prices of "baskets of consumables" have been developed by Jan de Vries and by Robert Allen, but the most comprehensive cost of living index is presented in detail in" Jan Luiten van Zanden, Prices and wages and the cost of living in the western part of the Netherlands, 1450-1800. http://www.iisg.nl/hpw/brenv.php

These factors all complicate the analysis of the standard of living. I will pass them over here in order to approach the matter from the other side, as it were. Instead of defining a budget constraint and asking how much of x, or x+y+z, a wage earner could buy, I will proceed by examining the cost of what actually was purchased. From this knowledge of what consumers <u>chose</u> to purchase we can work backward to consider what it might say about purchasing power and, hence, income levels. We do not have sufficient information to conduct this investigation into consumer choice at the household level, or even at the level of social class, but the sharp regional differences discussed above can serve as a point of entry. Consumers in east and west not only received different nominal wages and faced different relative bread prices, but they also chose to consume very different mixes of the available bread types. Moreover, these two "systems" did not exist in isolation from each other. As we just noted, every year thousands of inhabitants of the eastern provinces moved west, settling primarily in the cities of Holland, where they left one "food system" and voluntarily entered another. Do their choices reveal something important about the level of economic wellbeing available in the two regions?

The base line of our analysis is formed by the evidence introduced earlier in Table 12.4. Column 5 shows that eastern unskilled wage-earning households consuming only rye bread could improve their well being substantially by moving west. In 1600 their higher wages allowed them to purchase 40 percent more bread than in the east. But the same column reveals that this advantage was eroded over time; by the eighteenth century such a migrant found his higher nominal wage sufficient for only 85 percent of the bread he could have commanded with the lower wages prevailing in the east. Why then, did the migrant stream persist?

In fact, the puzzle before us is more challenging still. From Chapter 11 (bread consumption) we learned that consumers in Holland, and also Utrecht and Zeeland, consumed twice as much wheat bread as rye bread from at least the late seventeenth century onwards. This mix is an average for the total population, to be sure, but evidence was presented in support of the view that most households, even the poor and institutionalized, consumed a mix of both types of bread. The mix varied, but wheat and rye were definitely not an either/or proposition in the western Netherlands. Moreover, western consumers revealed a shift in preferences in favor of wheat bread in the course of the first two-thirds of the seventeenth century – that is, in the same period in which we have just seen that their rye bread purchasing power advantage over the eastern provinces disappeared. In contrast, eastern consumers in this period revealed no detectable change in their bread consumption preferences: rye bread remained

overwhelmingly dominant from beginning to end, accounting in large regions for some 85 percent of the total.

Not only did Hollanders eat rye bread that became progressively more expensive than in the east, but they ate more of the even costlier wheat bread, which sold at a large premium to the already high rye bread price, and they intensified this preference for wheat bread in the face of a pricing structure (described in Ch. 9) that seemed increasingly to discourage, if not to penalize, its consumption.

The standard of living actually experienced by those living in the Dutch Republic is revealed not only by the movement of wages and prices for a fixed basket of goods but also by the choices made by consumers to alter the composition of the basket itself. Economists maintain that maximizing consumers choose "the most preferred bundle from their budget sets," that is, they choose the best bundle of goods they can afford.[9] Their 'revealed preferences' say something important about what they value as well as about what they can afford.

What did an "average" household in each region spend on bread over the course of time? Table 12.5 offers estimates based on a simple model of bread expenditures relying on the estimated mix of wheat and rye bread presented in Ch. 11 and an assumed annual household consumption of 803 kg (2.2 kg. per day). In the east, the assumed bread mix is 15 percent wheat and 85 percent rye. In the west the assumed bread mix is 33 percent wheat and 67 percent rye in 1596-1619, rising to 67 percent wheat and 33 percent rye by the 1660s.

Following these procedures, Columns 1 and 2 displays the annual cost in guilders of 803 kg of bread in each region. Regional bread prices had not yet diverged greatly in the first period, 1596-1619, but the higher consumption of wheat bread caused Hollanders – on average – to spend 30 percent more for bread than easterners. This is a reasonable starting point, since nominal wages were higher by about that same amount. But in the following decades Hollanders' bread expenditures rose sharply. Column 9 shows that bread expenditures rose in every twenty-year period until by the 1680s they spent more than twice as much as easterners in order to secure an 803-kg bread supply, and this enormous difference persisted throughout the eighteenth century.

[Table 12.5]

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[9] Hal R. Varian, Intermediate Microeconomics. A Modern Approach (New York, W. W. Norton, sixth ed., 2003), p. 73.

The cost of an 803 kg breadbasket doubled from 71 guilders in 1596-1619, when it was two-thirds rye bread, to over 140 guilders by 1680-99, when it was two-thirds wheat bread. Meanwhile, the eastern basket, after rising initially from 55 to 72 guilders, remained at or below 70 guilders per annum until the end of the eighteenth century.

Part of the higher cost in the west was <u>imposed</u> on consumers: they faced higher production costs and much higher taxes no matter what type of bread they might choose to eat. We can measure this "inescapable" component of the expenditure differential by measuring the cost to the western consumer of the eastern bread mix (15 percent wheat – 85 percent rye) but at the prices prevailing in the west. Col. 3 shows the result of this exercise. This factor accounts for about one-third of the extra expenditures throughout. If migrants from the east chose to persist in an "eastern" consumption pattern in their new homes, this is the premium they would have paid for the privilege of enjoying the west's amenities.

One might expect that this burden placed on bread consumption in the western provinces encouraged Netherlands to eat less of it. It did, and we surveyed the bread substitutes and the roles they played in Ch. 10. We might also expect the majority of consumers to avoid the costlier wheat bread as its price rose both absolutely and relatively. But here our expectations are confounded: consumers in the west did just the opposite. Wheat bread consumption rose in spite of the impediments placed in its way, and it is this growing difference in bread consumption patterns that accounts for two-thirds of the difference between bread costs in west and east. That is, by their behavior at the bakery counters consumers in the west voluntarily <u>chose</u> to spend more on bread than they had in the past.

At the beginning of the seventeenth century consumers in both regions faced similar bread prices. Consumers in the west used a part of their higher earnings to purchase a superior mix of wheat and rye breads. Even at the 40%-60% wheat-rye mixture of 1620-39 they spent a smaller portion of a day's wages on bread than did their eastern counterparts who consumed at a 15%-85% wheat-rye mix. Thereafter, as westerners continued to increase their consumption of wheat bread such that it came to account for two-thirds of the total, their bread expenditures, on average, rose to more than twice the amount spent in the east for the same quantity of bread.

This increased cost was primarily a choice rather than an imposition, but it was not a choice everyone could make. There must have been many in Holland who could not follow this path toward more costly wheat bread consumption. And what of the numerous migrants from the east who found

that that their "bread purchasing power" was no higher in the high-wage west than it had been in their home region of low wages? As we have just seen, Hollanders who resisted the temptation to consume wheat bread did not escape all of the rising costs. If they consumed the eastern bread mix (but paying the higher western prices), they would have spent about the same percentage of their earnings on bread as those in the east up to 1700-19, but thereafter even such sober, "traditional" consumers had to relinquish a larger portion of their earnings than did easterners for the same bread packet.

Clearly, the attractions of life in Holland did not include cheap bread. The migration pattern and the bread consumption patterns would appear less puzzling if the east did not offer full employment and the west did, or if the west offered superior supplementary employment possibilities for family members. Much as an astronomer might predict the existence of an as yet undiscovered planet from observation of the movements of visible ones, I hypothesis from the voluntary behavior of migrants and consumers the existence of higher western household incomes than can be measured from observable individual day wage differentials. This remains to be confirmed, of course, but what I have uncovered here in the form of regional differences in bread consumption also existed as social class differences within a single region and, most important, as a gradual, economy-wide development over time – what Fernand Braduel had identified as a 'wheat revolution'.[10] This process, in which the western Netherlands participated as an early adopter, was economically more consequential that is generally recognized. It is simultaneously an important factor in the accurate measurement of the cost of living and a key development in the emergence of a commercialized consumer-focused economy.

Bread, deep commercialization, and the cost of living.

It is well known that the cost of living can vary enormously according to the range of comforts and conveniences that are regarded as belonging to a socially acceptable living standard. This can give rise to considerable debate about the correct composition of the basket of consumables used in establishing the cost of living. An evasion of these difficulties – and when sufficient price information in unavailable, a necessary simplification – is to use nothing more than the price of grain as the measure of the cost of

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[10] See Ch. 11, p. 22; Braudel, Civilization and Capitalism, Vol 1., pp. 137-38.

living.[11] It is, after all, the largest single portion of that cost for all but elite consumers.

Unfortunately, measuring the cost of this most basic element of the cost of living has its own complications. The specific form in which a household secures its basic dietary standard of carbohydrates, protein, and calories can lead to large differences in monetary cost.[12] A household that purchases grain of whatever type, or raises it on its own land, generally could not efficiently digest its grain without subjecting it to milling (in the case of wheat and rye) or breaking and husking (in the case of oats, barley and buckwheat). This processing step involved an expense of time or money. The household could then prepare the milled or husked grain in one of two basic ways: baking or boiling. We have been concerned here

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[11] The real wage thus becomes the 'grain wage', which measures the quantity of grain that can be purchased with a day's labor. I used a modified form of this approach to measure the incidence and severity of food crises in Ch. 4.

[12] Recent efforts to compare the living standards of workers in Europe and Asia have struggled with this problem. Comparative studies exploring the timing and scope of the Great Divergence have had to consider how to compare an Asian diet usually based on rice with European diets based on bread. (See: Stephen Broadberry and B. Gupta, "The Early Modern Great Divergence: wages prices and economic development in Europe and Asia, 1500-1800," Economic History Review 59 (2006), 2-31.) The former is consumed with much less processing and preparation than the latter. Should a rice diet be compared with one based on grains such as oats and barley consumed in the form of porridges, pancakes, and gruel, or should it be compared with bread grains after conversion to bread?

Robert Allen, seeking a methodology sufficiently universal to allow comparisons of purchasing power across around the world and across the centuries, proposed to measure "welfare ratios" (the ratio of wages to the cost of the consumption bundles) in which the consumption bundles were defined either as "barebones subsistence" or a "respectable standard." Both bundles included equal numbers of calories. The two standards differ in the allowances provided for luxury foods such as meat and dairy products, but are distinguished primarily by the grains consumed. The barebones household acquired over half its calories in the form of oats or barley in Europe (or, equivalent quantities of maize, rice, or millet in other societies); the respectable household consumed a nearly equal number of calories in the form of wheat bread.

Allen's methodology exposed very large difference in the cost of these two consumption bundles. In both Northwestern Europe (Amsterdam and London) and Asia (Delhi and Beijing) the respectability bundle cost at least three times as much as barebones subsistence in the early modern era. In Northwestern Europe, Allen found that unskilled laborers could usually command a respectability welfare ratio comfortably above one; elsewhere in both Europe and Asia, from the mid seventeenth century if not before, unskilled labor could secure adequate nutrition only at the barebones subsistence level. Allen, "Great Divergence," in Robert Allen, *et al.*; "Wages, Prices, and Living Standards in China, 1739-1925: in comparison with Europe, Japan, and India," Economic History Review 64 (2011), 8-38.

primarily with wheat and rye, the baked grains, but barley, oats, and buckwheat were consumed primarily in a boiled form – as porridges, gruels, or, when mixed with more glutinous grains, in the form of pancakes. Baked bread required access to an oven while a boiled grain could be produced with equipment likely to be available at the household hearth. The cost of an oven plus the greater expertise required to prepare baked goods led to the rise of a specialized profession of bakers.

This brief account suffices to reveal the successive stages of processing and preparation that stand between the <u>bare expense of grain</u> and the <u>full cost of the consumed food</u>. Some of those steps can be performed by the household's own labor and capital (kitchen equipment) while others are more demanding. Consider the following alternative ways in which European households fed themselves:

1: Purchased barley, oats, and buckwheat – themselves considerably cheaper per liter and per unit of caloric value than the baking grains – could be processed and boiled for ultimate consumption at little additional monetary cost. (The household labor involved in these processes might be considerable, but our concern here is primarily with monetary costs.) The cost of the consumed food in this case may be only 5-10 percent more than the bare cost of the grain.

2: Purchased rye or wheat, more costly grains, needed to be milled. The household could prepare the resulting flour plus yeast, salt, etc. into dough, but needs access to an oven for baking. A large farm household may invest in such an item of capital equipment, a lord may make one available to his serfs or tenants at a price, or a professional baker may lease space in his oven to self-baking householders. The consumed food will cost significantly more than in case one, since the milling and baking are more capital intensive and require more skilled labor than the preparation of boiled grains.

3: The household could dispense with purchasing grain and transforming it into a consumable product and instead purchase bread from a professional baker. In the Dutch Republic nearly all urban households had taken this step before the period that is our chief concern. Rural households practices were more varied, but the absence of grain production in large areas and the ready access to towns and villages caused self-baking to become a distinctly minority pursuit already in the seventeenth century. Consequently, a large majority of households purchased bread rather than grain, and its price incorporated the value added of the processing and preparation stages plus the costs of retail distribution. Under the old system bread-pricing regime that prevailed throughout Europe before the

seventeenth century basic rye bread and unbolted wheat bread cost approximately 50 percent more than the grains from which they were made.

4. Finally, the household could rely even more on the expertise of the baker in order to purchase wheat breads made from refined flour and costly ingredients such as eggs and milk. The grain undergoes additional processing in the form of bolting and sifting which reduces the bread yield per kilogram of grain, and the flour is transformed into white loaves and rolls requiring an expertise that home bakers rarely possessed. By the mid eighteenth century consumers in northern France and southern England had joined those of the western Netherlands (and many in the southern Netherlands) to regard white bread as a necessary part, though not necessarily the only part, of their total bread consumption.

These four bread grain consumption scenarios form stages in which the consumer purchases steadily more costly grains. But even more significant is the choice to purchase products in which progressively more "value added" is inserted between the cost of the basic commodity and the cost of the consumed product. These stages were not mutually exclusive; they could live side by side for centuries within the same society. To some extent they represented regional adaptations to ecological and commercial constraints (oats in Scotland, barley in northern England, wheat in the south); to some extent they represented the income constraints of social classes (more rye bread for the poor, more wheat for the well off). But over the course of many centuries, from the late Middle Ages to the mid-nineteenth century, major regions of western Europe moved a least part way though these stages, some areas faster and more completely than others.

As the "normative" form of bread grain consumption in a society passed through these stages the "base line" expense of the bread grain element of the diet rose substantially, independent of the underlying price trends of the grains themselves. Figure 12.4 offers Dutch price evidence to illustrate how consequential the movement through these steps could be. Panel A presents the cost for successive 20-year periods for calorically equivalent amounts of the grains and breads (810 liters of grain; 803 kg of bread). In 1596-1619 a household could survive on buckwheat at an average annual cost of 21.53 guilders (the cost of the grain plus 10 percent for tax and grinding costs) or they could feast on fine white bread from the baker at 129.68 guilders – nearly six times as much. Over time these cost differentials only grew.

We have seen in earlier chapters that Dutch households rarely consumed only one type of grain or bread. Thus, to better capture the actual consumption strategies of Dutch social classes over the course of time Table 12.6 **[not included in this paper, but summarized in figure 12.7]** presents the cost in guilders for six "bundles", each representing 810 liters of grain or 803 kg of bread per year, designed to capture in a stylized way the consumption practices of various Dutch class and regional populations in the early modern era.

1. Bare bones. Only grain: 50% buckwheat, 50% rye. This represents a subsistence level standard of living in which the household subsists on boiled grain and coarse home baked bread.

2. Simple and sober. Grain and bread: 33% buckwheat, 67% rye bread. This represents a diet that may have been characteristic of poor households both urban and rural. It depended primarily on purchased bread of the cheapest kind plus porridge.

3. Basic. Grain and bread: 33% buckwheat, 33% rye bread, 33% unbolted wheat bread. This is a diet that became more common, particularly in urban environments, as wheat bread consumption spread.

4. Basic plus. Only bread: 50% rye bread, 50% coarse wheat bread. This more costly diet depends entirely on purchased bread.

Figure 12.4. Cost of an annual supply of bread grain or bread 1550-1819.
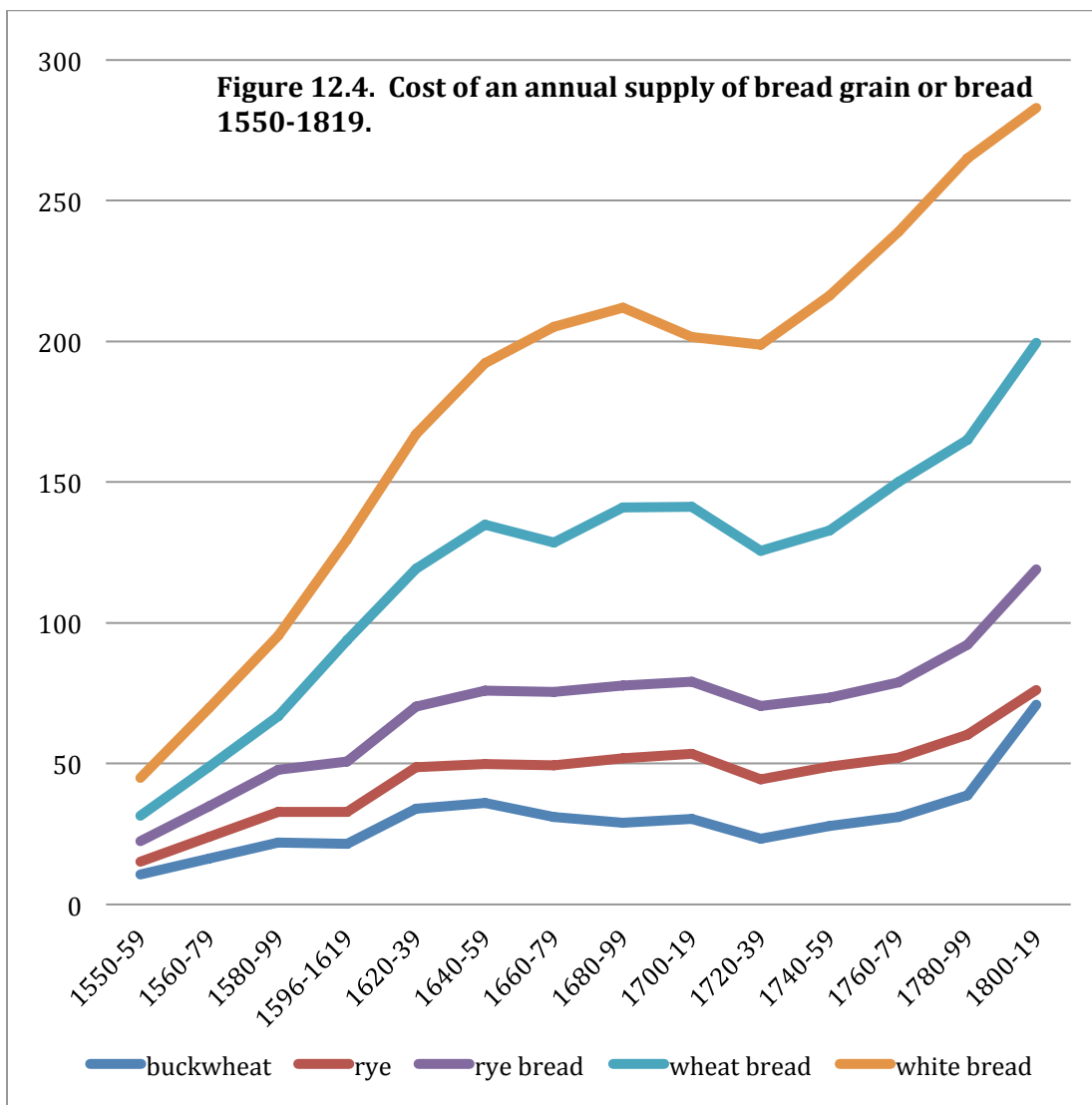
5. Republican standard. Only bread: 33% rye bread, 33% coarse wheat bread, 33% fine white bread. This diet represents the approximate average bread consumption pattern of the western provinces in the eighteenth century

6. Wheat bread standard. Only wheat bread: 50% coarse wheat bread, 50% fine white bread. This diet, depending entirely on wheat breads, represents an idealized version of the consumption pattern of the well-to-do who could dispense with both boiled grain and rye bread. Of course, an even higher consumption standard is possible, in which only bolted wheat breads are consumed.

Panel B displays the annual cost of each of these consumption bundles as a percentage of the annual earnings of an unskilled worker in the west. It

reveals a number of important features of the choices facing early modern consumers. First, rye bread was far from the cheapest available option. The boiled grains were always considerably cheaper, as was home-produced bread. Second, the annual costs of these six bundles – each representing plausible consumption practices of sizeable social groups – differed enormously; bundle 6 routinely cost four to five times as much as bundle 1. Most Netherlanders found themselves choosing among bundles 2 through 5, but even here the cost range exceeded 100 percent, which we have just seen was the eighteenth-century difference between the <u>regional average</u> bread expenditure in the west relative to the east.

The Dutch participated in a process of changing bread consumption practices common to most of northwestern Europe between the late middle ages and the late nineteenth century. At the beginning boiled grains and coarse breads were common and wheat bread was an urban luxury. At the end wheat bread dominated the diet and lesser grains were fast disappearing. The speed and timing of this transition – whose successive stages are presented in stylized form by the six consumption bundles of Table 12.6 – varied from region to region. In the western Netherlands it made important headway in the seventeenth century, but (as we will see in Chapter 14) was completed only after 1850; in Southern England and Northern France a major shift toward wheat was made in the course of the eighteenth century; in outlying areas of the British Isles, and throughout Germany, a major shift occurred only in the nineteenth century. Once begun, this process led to a large increase in household expenditures on what from a distance can appear as nothing more than the acquisition of basic food, "the staff of life," a quantitatively constant consumption of calories, carbohydrates and protein.

Engel's Law, as we have seen, holds that household expenditure on food declines as a percentage of income as incomes rise, both over time and in the cross section, among households at a point in time.   Ch. 9 presents evidence that overall food expenditures conformed to this law, but that evidence was based on the conservative orphanage feeding practices and does not fully reveal the factors pushing bread expenditures upward over time in the larger population. If these expenditures did not decline as much relative to total income as Engel's Law predicts it may be explained if we make a distinction – as I did in the stylized model of consumption alternatives above -- between the purchase of agricultural commodities (farm crops as they are sold on the market) and the purchase of commercial commodities ready for direct consumption (the retail sale of

bread, in this case). That is, <u>final food consumption</u> is the product of two kinds of consumption:[13]

$F = F_a + F_b$, where

F_a = consumption of agricultural commodities, and
F_b = consumption of food product enhancements provided by transport, processing and marketing.

If this distinction is accepted, then the income elasticity of demand for any foodstuff is the sum of two elasticities, one for the basic agricultural product and one for the subsequent processing services:

$\eta = \eta_a + \eta_b$.

The first, η_a, is what Engels' Law is held to refer to and its demand elasticity is usually low; but η_b is a demand for something else, not food *per se*, but labor saving convenience, taste, status, and health. The demand elasticity for this can be quite high.

In an earlier work I argued that early modern consumers in Northwestern Europe experienced an industrious revolution, a simultaneous intensification of market-oriented work effort and increase in the purchase of consumer goods.[14] I argued that this revolution was propelled by an intensified desire for new goods, especially those that economized on the use of household labor in the transformation of purchased goods into that which was ultimately consumed. The goods that could incentivize such behavior included tropical commodities, such as sugar, tobacco, tea, and coffee; Asian manufactures, such as cotton textiles and porcelain; and a variety of European manufactures, such as distilled spirits and home furnishings. One is naturally inclined to look for powerful commercial novelties to push forward so profound a transformation of the inner workings of the household economy. Profound changes must have profound causes. Yet one of the quantitatively most important of the "incentive goods" of this era was nothing more exotic than wheat bread – hidden in plain sight, as it were. Over the course of the seventeenth and eighteenth centuries, wheat bread changed -- first in the western Netherlands, followed by southern England and northern France -- from a secondary place in the common diet to a position of dominance, accounting for at least two-thirds of total bread grain consumption. As the

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[13] This discussion and the notation is based upon Gregory Clark, Michael Huberman, and Peter Lindert, "A British Food Puzzle, 1770-1850," <u>Economic History Review</u> 48 (1995), 215-37.

[14] Jan de Vries, <u>The Industrious Revolution. Consumer Behavior and the Household Economy from 1650 to the Present</u> (Cambridge, Cambridge University Press, 2008), esp. Ch. 4.

sketch of bread consumption stages in Table 12.6 reveals, this shift, invisible from the highly aggregated perspective of most cost of living studies, required households greatly to increase their cash expenditures. This expenditure increase was even greater in the Netherlands than in the other participating regions of the 'wheat revolution' because state policy was alert to changing consumer preferences and acted early on to harness them to the Republic's fiscal needs.

 The economic historian confronts the aspirational consumer

So, did Hollanders become worse off or better off in the course of the seventeenth century, their Golden Age? The conventional approach to is to measure the amount of a basket of goods (or simply a basket of grain) that can be purchased by the daily wage of an unskilled laborer (or, in Allen's "welfare ratio" approach, the number of such baskets that can be purchased by the wage). This is a useful way to compare the standard of living in different places, and it is also a valuable tool for identifying basic trends in purchasing power in the same place over time – which is our interest here. Figure 12.5 displays the welfare ratio for unskilled construction labor in Holland using Allen's "respectability basket" to represent the cost of living and average unskilled construction wages in Holland to represent annual earnings.[15] The 13-year moving average of these welfare ratios show:

1. The welfare ratio always comfortably exceeded one – the ratio at which income is just enough to secure the respectability basket of goods for a household of average size (3.25 adult-equivalents) – except in the final years of the eighteenth century, as the entire European economy experienced a severe war-induced price inflation.
2. The welfare ratio rose to a succession of peaks in around 1620, 1680 and 1730. At these peaks unskilled workers were 20 to 40 percent better off than they had been in the mid-sixteenth century, depending on the preferred estimation of the days worked per year.
3. The prevailing high welfare ratio after 1600 was checked periodically, even in the smoothed 13-year moving averages, by the influence of spikes in grain prices, most notably in 1630, 1698 and 1709.
4. The upward trend was decisively reversed after the 1730s as prices for most goods included in the consumer basket began a sustained rise while wage rates remained roughly constant.

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[15] Following Allen's usage, the cost of the respectability basket is multiplied by 3.25, to represent an average household of two adults and xxx children and the daily wage is multiplied by 250 days of labor. A second, adjusted, calculation is presented to represent the effect on average annual earnings of the radical reduction of religious holidays imposed by the Reformation beginning in 1574. The adjustment provides for a gradual 15 percent increase in annual days worked in the period 1590-1610. Thus, after 1610 the daily wage is multiplied by 287 days.

This is a useful starting point for a discussion of purchasing power in the early modern era, but, as we have just noted, the actual behavior of most consumers in the western Netherlands was not unchanging in the manner assumed by the respectability basket, or, indeed, any of the other weighting systems use to calculate purchasing power found in the literature.[16] This sturdy technique for making gross comparisons over time and space is not really designed to incorporate our findings of changing patterns of bread consumption. Indeed, if we attempt to do so – by replacing an assumed fixed diet of rye bread with a diet in which wheat breads

Figure 12.5. Welfare ratios for unskilled construction labor in Holland, 1550-1800. 13-year moving averages, assuming 250-day work year and adjusted work year.
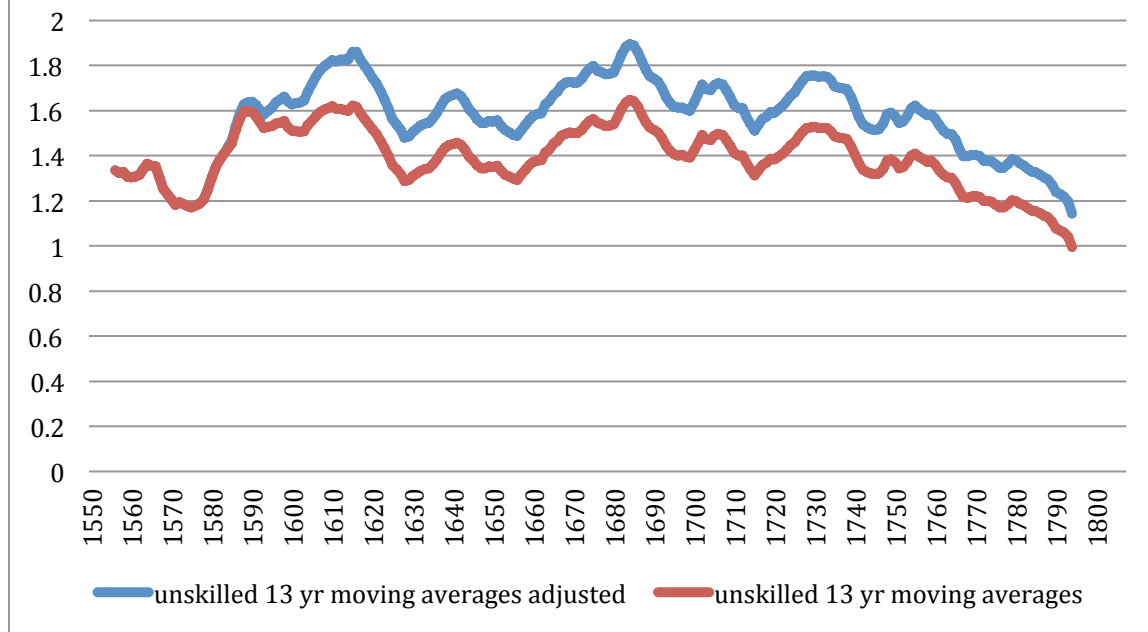
[16] Cost of living indexes are presented in: De Vries and van der Woude, First Modern Economy, pp. p. 628 and De Vries "How did Pre-industrial Labour Markets Function?," in George Grantham and Mary McKinnen, eds., The Evolution of Labour Markets (London, Routledge, 1994), pp. 39-63; J.L van Zanden, "Prices and wages and the cost of living in the western part of the Netherlands 1450-1800," http://www.iisg.nl/hpw/brenv.php.
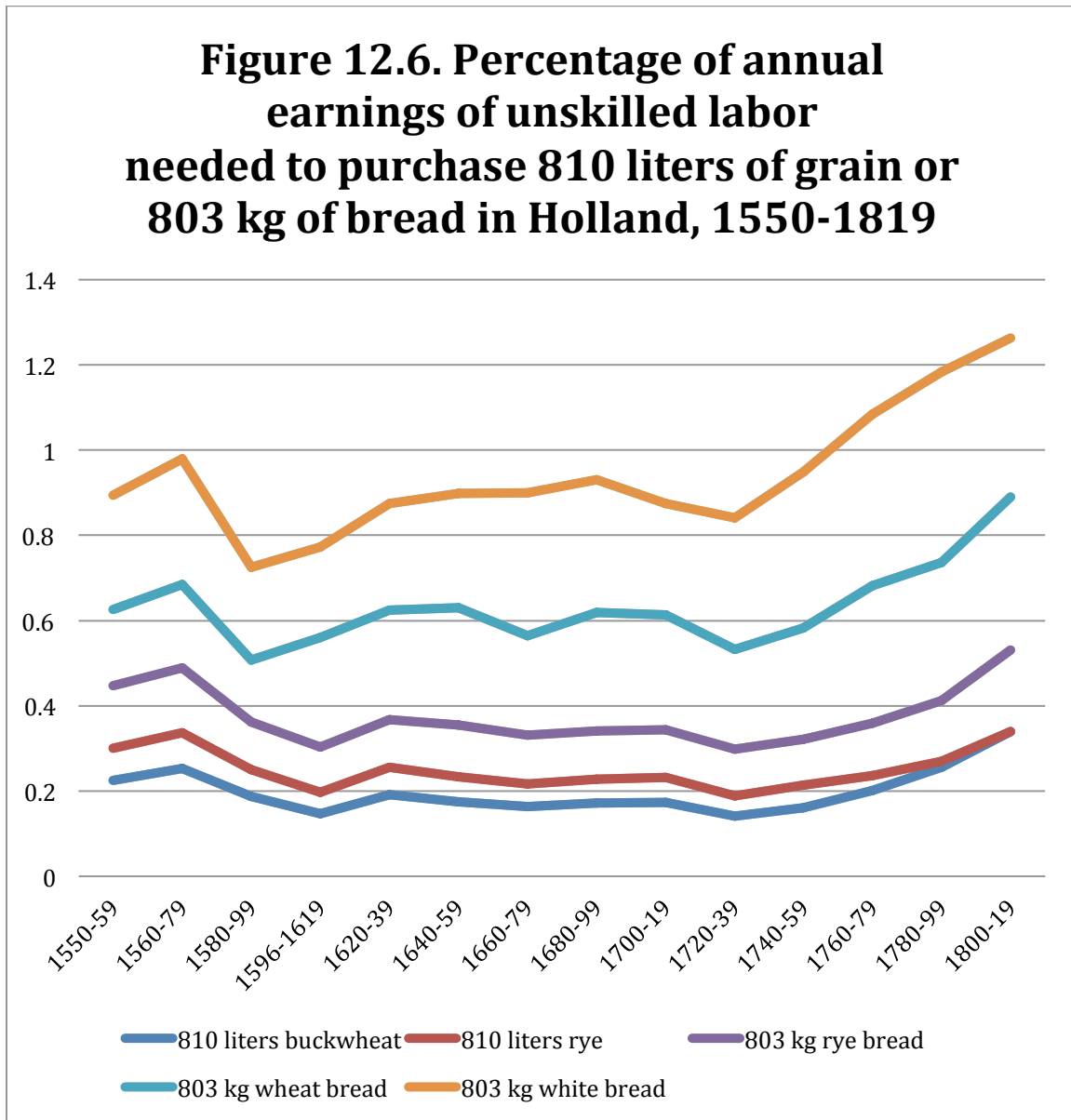
grow in importance, the Dutch standard of living plummets. In short, the modest rise in purchasing power revealed by the conventional method is incapable of accommodating the very substantial increase in bread expenditures that actually occurred in the course of the "wheat bread revolution".

Figure 12.6 reveals the scope of the problem. It shows the trend over successive twenty-year periods in the portion of an unskilled laborer's annual earnings required to purchase equivalent amounts of grain (buckwheat or rye) and bread (rye bread, coarse wheat bread, and fine white bread). The grain prices include the milling fees and taxes to which consumers would have been subject, even when they prepared their grains at home. Over the course of the century from 1580-99 (from the eve of the introduction of the Republic's innovations in taxation and bread price regulation) to 1680-99 (when taxation reached its apogee) the costs of these alternative diets varied systematically.

Table 12.6 summarizes the basic pattern revealed in Figure 12.6. During the century ending in 1680-99 a buckwheat diet became relatively less expensive by a quarter while a self-baking household could secure rye for nearly 10 percent less of its earnings than a century earlier. The purchaser of rye bread suffered a small deterioration of purchasing power while those who purchased the wheat breads found costs rising faster than their wages by about a quarter. Thus, the purchasing power of laborers rose significantly if they held to a diet of boiled grains and self-baked rye bread, but declined significantly if they switched to wheat bread. Yet many households appear to have made precisely this change over the course of the period. In the century following 1680-99 the differences are less pronounced. The cost advantage of buckwheat declined in the late eighteenth century – and disappeared altogether in the nineteenth – but otherwise the relative costs of the available alternatives did not change greatly. Unskilled workers faced a deterioration of their purchasing power after the mid-eighteenth century no matter what type of bread they ate.

[Table 12.6]

If consumers are given no choice to alter their diet, we can measure an increase in their purchasing power over the course of the Dutch Golden Age, but if we follow the apparent evolution of food expenditures over this period, most consumers appear to have chosen breads that increased their expenditures faster than their incomes rose -- as measured by the daily wage rate. Incomes differed, of course, and not all consumers made the same choices. Clearly, the unskilled laborer faced a more constrained range of options than the statistical "average" consumer.

Figure 12.6. Percentage of annual earnings of unskilled labor needed to purchase 810 liters of grain or 803 kg of bread in Holland, 1550-1819


We can achieve a rough idea of the costs facing households as they sought to upgrade their bread consumption by returning to the 'bread bundles' introduced above, and calculating the proportion of annual income each required over time. In this exercise we will measure annual income by the wage rates of skilled construction laborers in Holland, standing for the "average" consumer.

Figure 12.7 presents this information, and traces a path that Dutch consumers, in the aggregate, appear to have followed over the course of the 1550-1819 period. The elusive average consumer, who in the sixteenth century needed some 30 percent of income to acquire a bread bundle in which rye bread predominated, shifted to a bread bundle dominated by wheat bread in the course of

the seventeenth century. At first rising wages kept pace with the additional cost of the preferred diet – it continued to require about 30 percent of annual wage earnings – but from the 1680s through the 1750s it usually required 40 percent. As we have seen, the rise of Holland's milling excise in 1680 accounts for most of this increase in real cost. After 1760 matters became even worse for the unskilled laborer: the "average" bread bundle now required up to 50 percent of his earnings.

Figure 12.7. Percentage of a skilled construction laborer's annual earnings needed to pruchase six 'bread bundles', 1550-1819, with hypothesized path of average consumption.
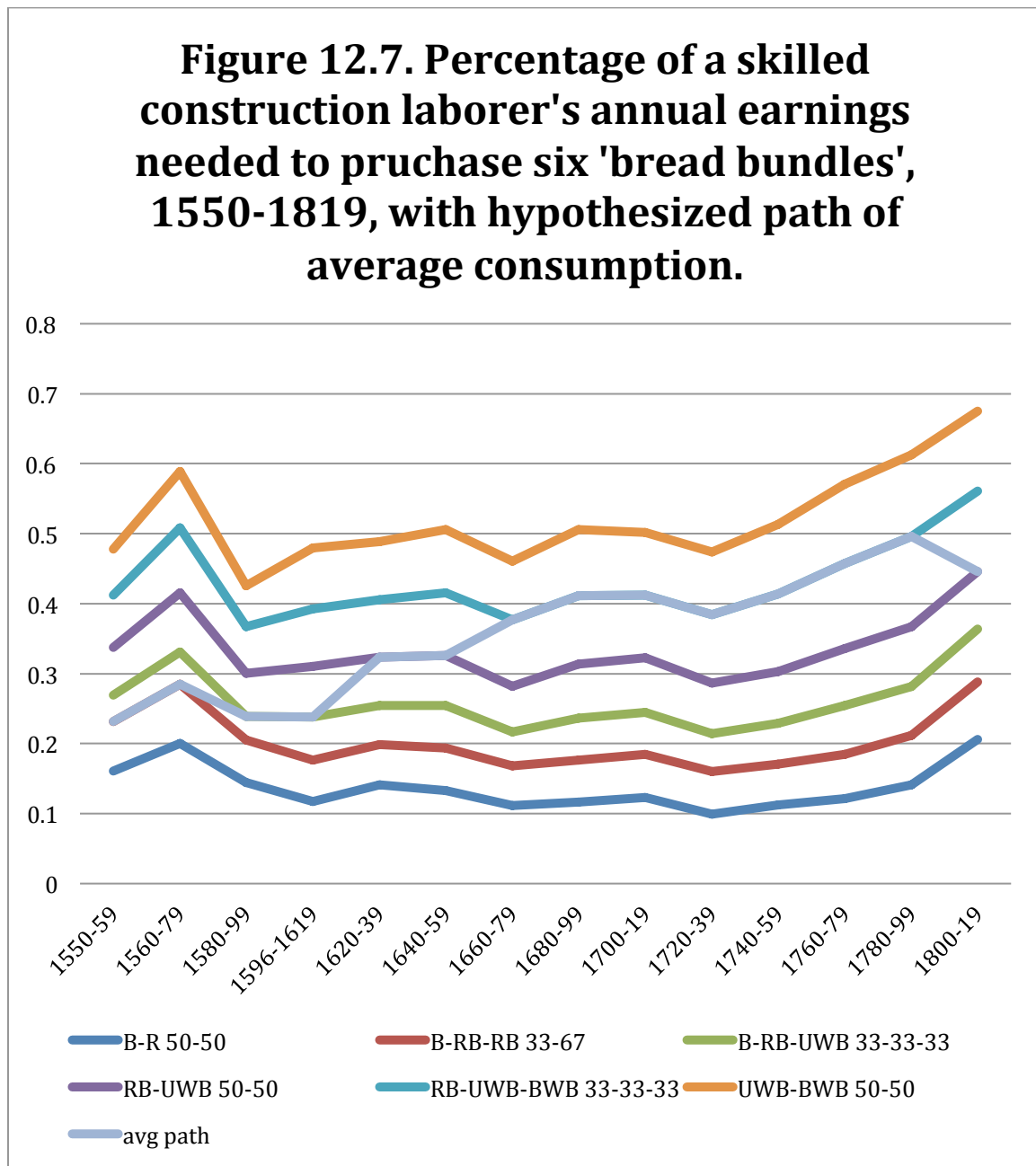
How can we resolve the puzzle of consumption trends whose costs exceed the realm of possibilities as revealed by the wage evidence? There are several possibilities:

1. <u>Consumers pursued their preferences for wheat bread, but reduced their total bread consumption</u>. The household that purchased 803 kg of bread, mainly rye bread, in 1580, purchased much less bread, mainly wheat bread, in 1680.   In Ch. 10 we argued that this is precisely what happened. But it removes, at best, only a small part of the gap between earnings and expenditures since this reduction in bread consumption was made good in part by increased consumption of even more costly sources of calories, such as dairy products and meat. Only in a later phase, after 1750, did the consumption of legumes and potatoes begin to weigh more heavily in the overall diet, and allow for a reduction in total expenditures

2. <u>The "average" consumer after the mid-seventeenth century, eating two loaves of wheat bread for every loaf of rye bread, was actually a statistical fiction</u>. Income inequality was far too great for national averages to have much meaning. There were, of course, social class differences in the 'bread bundles' consumed, but we have seen in Chapters 9 and 10 that these were differences of degree rather than of kind. After all, the richest 20 percent of consumers could not consume enough wheat bread to cause its consumption among lower social groups to be negligible.[17] Most social groups moved to a 'higher', costlier, bread bundle over time, even though they did not all rise to the most wheat-intensive bundles. This argument, like the first, can resolve only a small part of our problem.

3. <u>The daily wage is poor guide to annual household incomes.</u>. We have already discussed the shortcomings of setting annual household earnings equal to the daily wage multiplied by a fixed number of days of labor. The Dutch work year almost certainly rose between the 1580s and 1620s and later, especially after 1760, wage accounting practices understate the earned wage in some – perhaps many – cases.[18] When one adds to this the

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[17] Overall after 1680, 67 percent bread consumption consisted of wheat bread. If per capita bread consumption was equal across income groups and the richest twenty percent of households consumed only wheat bread, the remaining eighty percent would have consumed, on average, 57 percent wheat bread.

[18] The most consequential of these practices was the payment of "extra *schoften*" The work day was commonly divided into periods between meal breaks. Except in the short winter days there were four such *schoften*. Wages could be raised (without revealing this as a general wage rise) by paying for a fifth *schoft*. This was a common practice in the last decades of the eighteenth century. Jan de Vries, "How Did Pre-Industrial Labor Markets Function?" in George Grantham and Mary MacKinnen, eds., The Evolution of Labour Markets (London, Routledge, 1994), pp. 39-63: "An Employer's Guide to Wages and Working Conditions in the Netherlands, 1450-1850," in Carol Leonard and Boris Mironov, eds., Hours of Work and Means of Payment: the evolution of conventions in pre-industrial Europe (Milan, XI International Economic History Congress, 1994), pp. 47-63.

imponderable of the earnings of wives and children there is strong reason to believe that household earnings rose faster than is indicated by daily male wage rates alone.

This third argument has the potential to explain much more than the first two and deserves further exploration, which we can do by reversing the standard approach to standard of living studies. Instead of calculating how much bread one can purchase with an assumed income, we can calculate the average income required in order to purchase the 'bread bundles' prevailing at various times across the seventeenth and eighteenth centuries. Figure 12.8 displays the results of this exercise. For successive 20-year periods it shows the household income needed to purchase the prevailing 'bread bundle' under the assumption that one-third of income is devoted to the bread grains. This consumption-based approach to estimating average household income can then be compared to the conventional income based approach, the annual earnings of skilled laborers (journeymen construction workers) assumed to work 250 days per year before 1600 and 287 after 1620. These earnings comfortably exceed the amount required to purchase the prevailing bread bundle until 1620-39. However, from 1640 to 1760 the required earnings, 400-430 guilders per year, exceed the skilled labor wage by approximately 25 percent. After 1760 the required income rises further, peaking at 500 guilders around 1800 – nearly 50 percent above the wage rate – before declining in the 1820s to a level only slightly above the skilled labor wage. It is interesting to note here than the cost of the same bread bundles would not have exceed the 33 percent of income norm until after 1760 if bread had not been taxed. But, of course, it was taxed, and Figure 12.8 helps identify the "missing" household earnings needed to account for the observed behavior of consumers.

Could average household income in Holland and its western neighbors have been this much higher than the wage-based earnings estimates? One hint that annual earnings may have risen more rapidly than is suggested by daily wages is provided by the earnings of <u>salaried</u> employees. The historical course of salary incomes is an understudied topic.[19] But it is a potentially important supplement to wage data. Just as the comparison of piece rate payments and daily wage rates can reveal changes in work intensity, or industriousness, so the comparison of salaries

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[19] Scholars have avoided salary data have for several good reasons. To begin with, salaried occupations are heterogeneous, making generalization from specific examples hazardous. Second, many salaried occupations in early modern times were not full-time jobs, complicating the interpretation of their absolute level. Third, many salaries were supplemented by additional income derived from the right to levy fees, by room and board and other perquisites whose monetary value is either quantifiable or unstable over time, or both. These are all potentially serious sources of mismeasurement. In the index of Dutch salaried incomes used in Figure 12.xx, I have excluded all occupations known to provide room and board (since the course of food costs differed significantly from other costs in this time period) and have included only salaried occupations where supplemental earnings appear not to have been the dominant source of income.

and wage rates – even when the they do no refer to the performance of the same tasks – can reveal changes in the expected, or normative, length of the work year.[20]

Figure 12.8. Journeymans' annual earnings compared to earnings needed to spend 33% on 'average' bread bundle, with and without taxes, 1550-1839
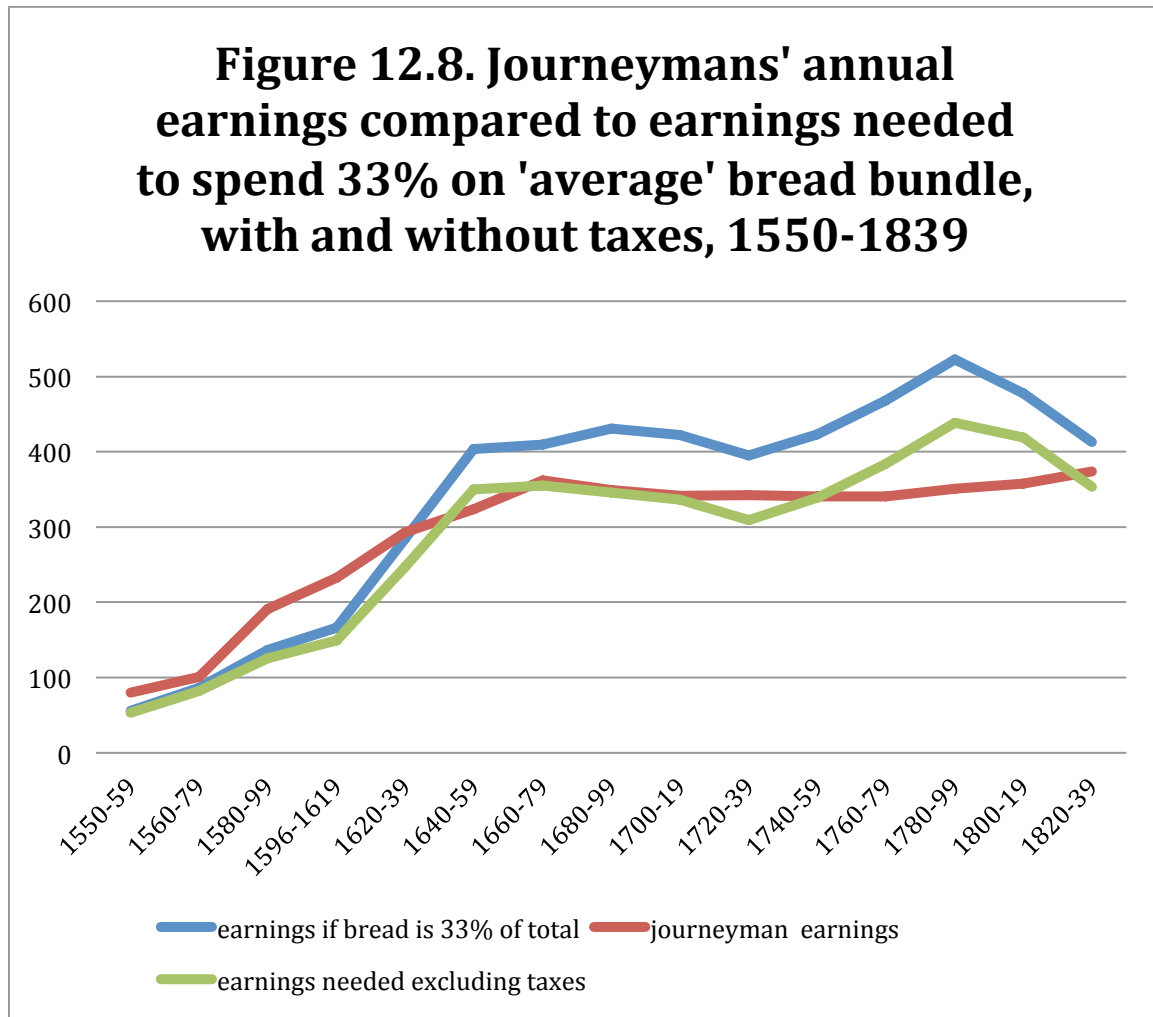
Figure 12.9 shows the long-term trend of the ratio of annual salaries in the western Netherlands to daily wage rates for skilled construction labor. Wage earnings –

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[20] Salaried positions included occupations requiring special training – doctors, schoolmasters, clergymen – but also included such occupations as windmill operators, watchmen, lamplighters, sewage haulers, and scribes at the town gates. The comparison of piece rates and day wages in agriculture is carried out in Gregory Clark, "The Long March of History: Farm Wages, Population and Economic Growth, England 1209-1869," Economic History Review 60 (2007), 97-136. For an examination of English day wages and annual salaries (in this case, chiefly the salaries of farm servants) that uncovers the same general pattern as I find here, see: Jane Humphries and Jacob Weisdorf, "The Wages of Women in England, 1260-1850," Journal of Economic History 75 (2015), 405-47; Jane Humphries and Jacob Weisdorf, "Unreal Wages? A New Empirical Foundation for the Study of Living Standards and Economic Growth in England, 1270-1860," Working Paper xxxxx.

Figure 12.9. Wage/salary ratio, Western Netherlands, 1580-1815
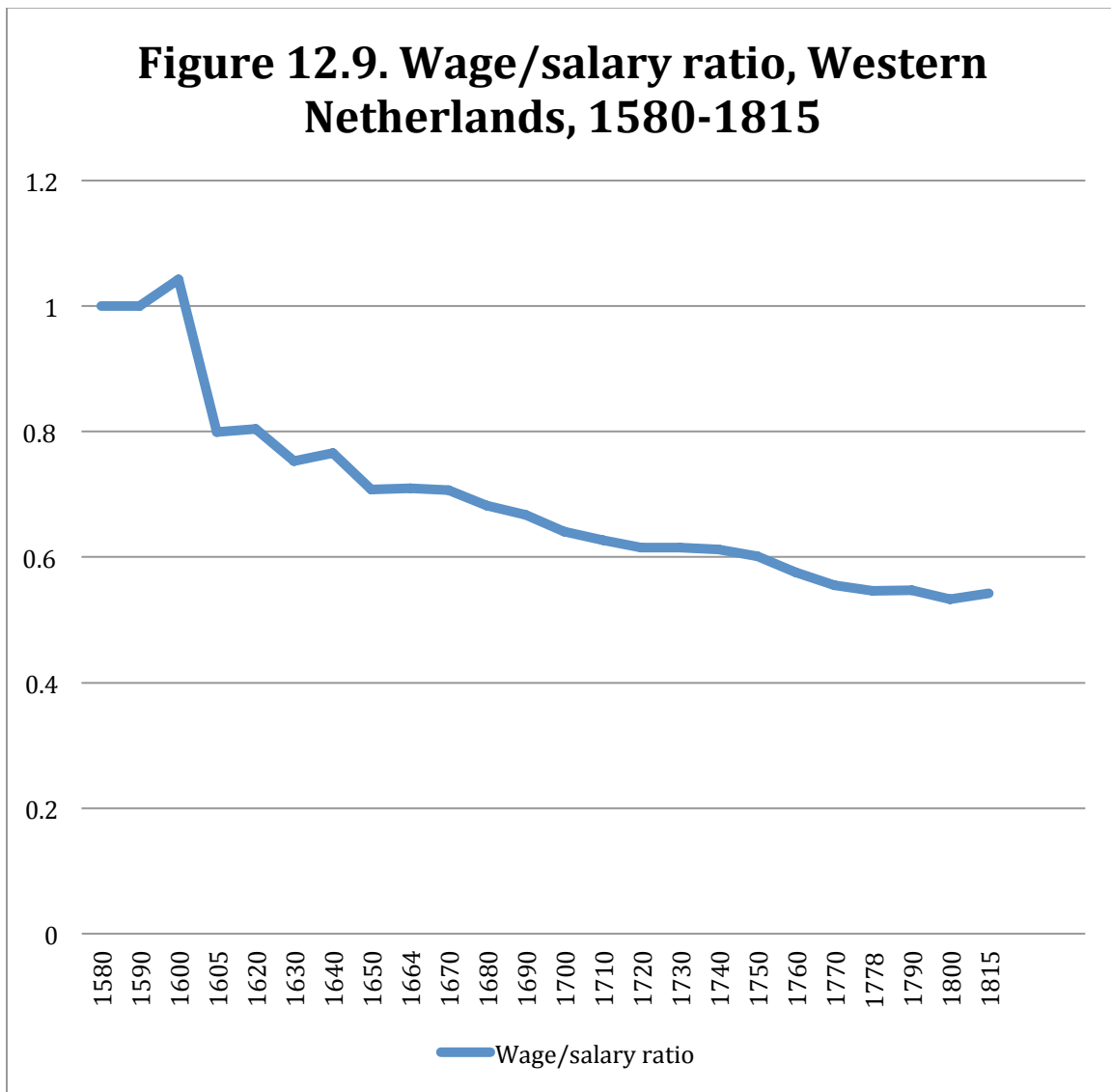
Sources: The index of salary earnings is an unweighted average of nine separate salary collections:
Middelburg, municipal government, seven occupations
Middelburg, Latin school, all teachers
Goes, municipal government, ten occupations
Amsterdam, municipal schools, all teachers
Amsterdam, municipal schools, all rectors and conrectors
Amsterdam, all Reformed clergymen
Smaller cities of Holland, all Reformed clergymen
Rural Holland, all Reformed clergymen
Central Holland, seven windmill operators for the *Hoogheemraadschap van Rijnland*.

The index of average salaries was calculated per decade and compared to the index of daily wages for journeymen carpenters and masons in Holland Zeeland, and Utrecht. See: De Vries and van der Woude, FME, Table 12.1 updated.

assuming a constant number of days worked per year – declined relative to annual salaries continually over the seventeenth and eighteenth century. The sharp deterioration recorded at the beginning of the seventeenth century may exaggerate the actual course of events, but even if the implied doubling of annual salaries relative to wage earnings over the entire time period might be doubted, the long-term persistence of the trend in favor of salaried workers offers an intriguing piece of evidence for the reconciliation of consumer behavior with income evidence.

The salary evidence also fits nicely with a second and more comprehensive body of evidence in support of my claim that daily wage data are likely to understate the rise of household earnings: time series of gross domestic product (GDP). A well-founded time series of Dutch GDP begins with 1807. More speculative GDP estimates, but now only for Holland, are available for the period 1511-1807.[21] Moreover, these Dutch estimates can now be compared to more detailed data for Britain and other countries.[22]

Figure 12.10 displays the course of real GDP per capita (in 1700 guilders) for both England and the Netherlands (Holland) over the period 1510-1870. The very long-term growth trends in the two countries are similar: 0.20% per annum in England vs. 0.15% per annum in Holland over the period 1510-19 – 1790-99. Dutch growth was concentrated in the 1510-1650 period, when English real income actually declined , while England's growth was concentrated in the 1650-1720 period, when it caught up with the slow-growing Netherlands. In the eighteenth century, when Britain embarked on its Industrial Revolution, the data show – surprisingly – rather similar growth trends in the two countries.

The Dutch real wage trends introduced above do not lead us to expect these results, certainly not in the eighteenth century, when daily wages were flat and real wages deteriorated. Indeed, a ratio of the skilled construction wage to Dutch GDP per capita, shown in Figure 12.11, shows a persistent long-term deterioration of the wage rate relative to GDP by nearly half – echoing the deterioration of wages relative to salaries discussed earlier.

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[21] Jan-Pieter Smits, Edwin Horlings, and Jan Luiten van Zanden, <u>Dutch GNP and its Components, 1800-1913</u> (Groningen Growth and Development Centre, Monogrpah Series no. 4, 2000); De Vries and van der Woude, <u>First Modern Economy</u>, pp. 701-07; Jan Luiten van Zanden and Bas van Leeuwen, "Persistent but not consistent. The Growth of National Income in Holland, 1347-1807," <u>Explorations in Economic History</u> 49 (2012), 119-30.

[22] Broadberry, *et al.*, <u>British Economic Growth</u>. Pre-1800 GDP estimates have also been made recently for Spain and Tuscany. C. Álvarez-Nogal and L. Prados de la Escosura, "The Rise and Fall of Spain, (1270-1850)," <u>Economic History Review</u> 66 (2013), 1-37; Paolo Malanima, "The Long Decline of a Leading Economy: GDP in central and northern Italy, 1300-1913," <u>European Review of Economic </u>History 15 (2011), 169-219.

Figure 12.10. GDP per capita in England, Holland, and the Netherlands, 1511-1870 in 1700 guilders
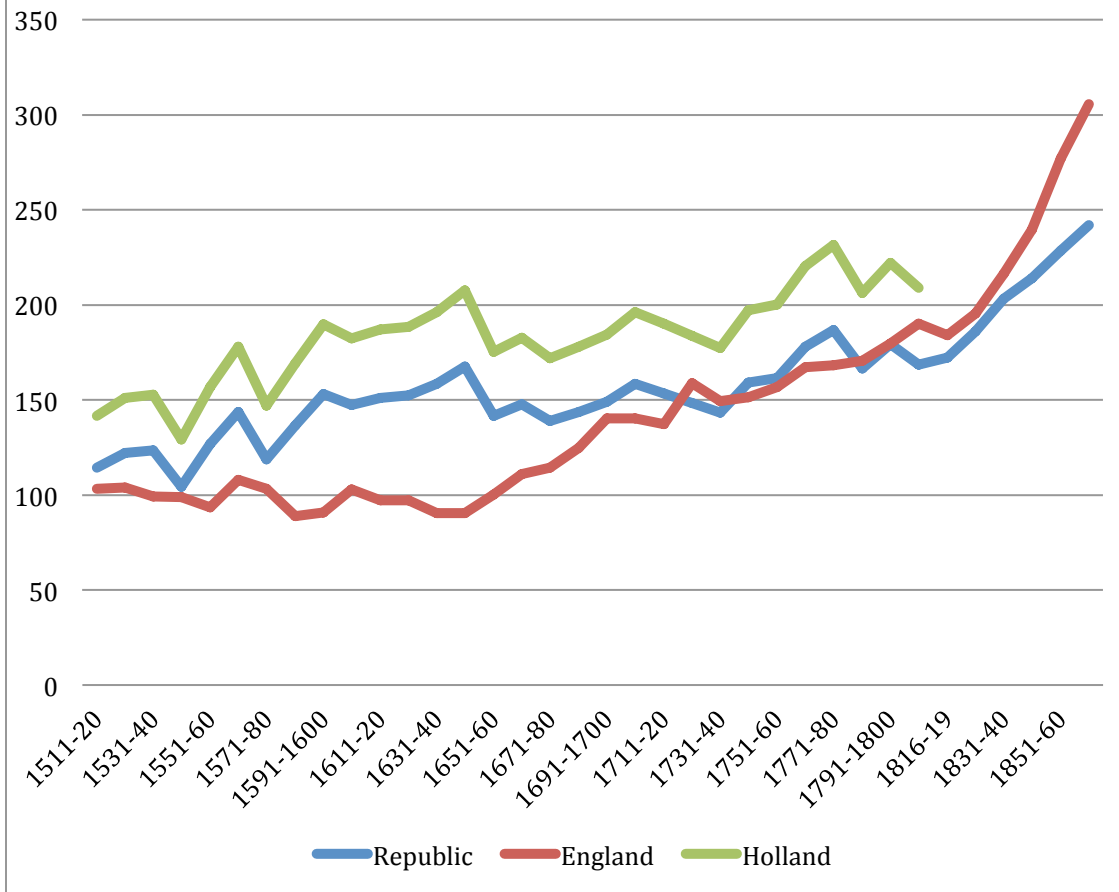
Sources: Broadberry, et al., British Economic Growth, 1270-1870, Appendux 5.3, Van Leeuwen and Van Zanden, "Persistent not consistent," and Van Leeuwen and Van Zanden, "The Character of Growth before 'Modern Growth'? The GDP of Holland between 1347 and 1807," Center for Global Economic History Working Paper no. 4, http://www.cgeh.nl/working-paper-series/.

These sources supply GDP estimates for Holland, 1510-1807, and the Netherlands from 1807 onwards. My estimate of GDP for the Netherlands as a whole before 1807 assumes GDP per capita in Utrecht and Zeeland was 95% of Holland, and 67% of Holland in the remaining, Eastern, provinces. These estimates were then weighted by the population shares of each region, period by period. This can serve only as a rough estimate, but offers a more realistic picture of the evolution of GDP in England and the Netherlands/Dutch Republic than does a focus on Holland alone.

Figure 12.11. Ratio of skilled construction wages to GDP per head, 1511-1807
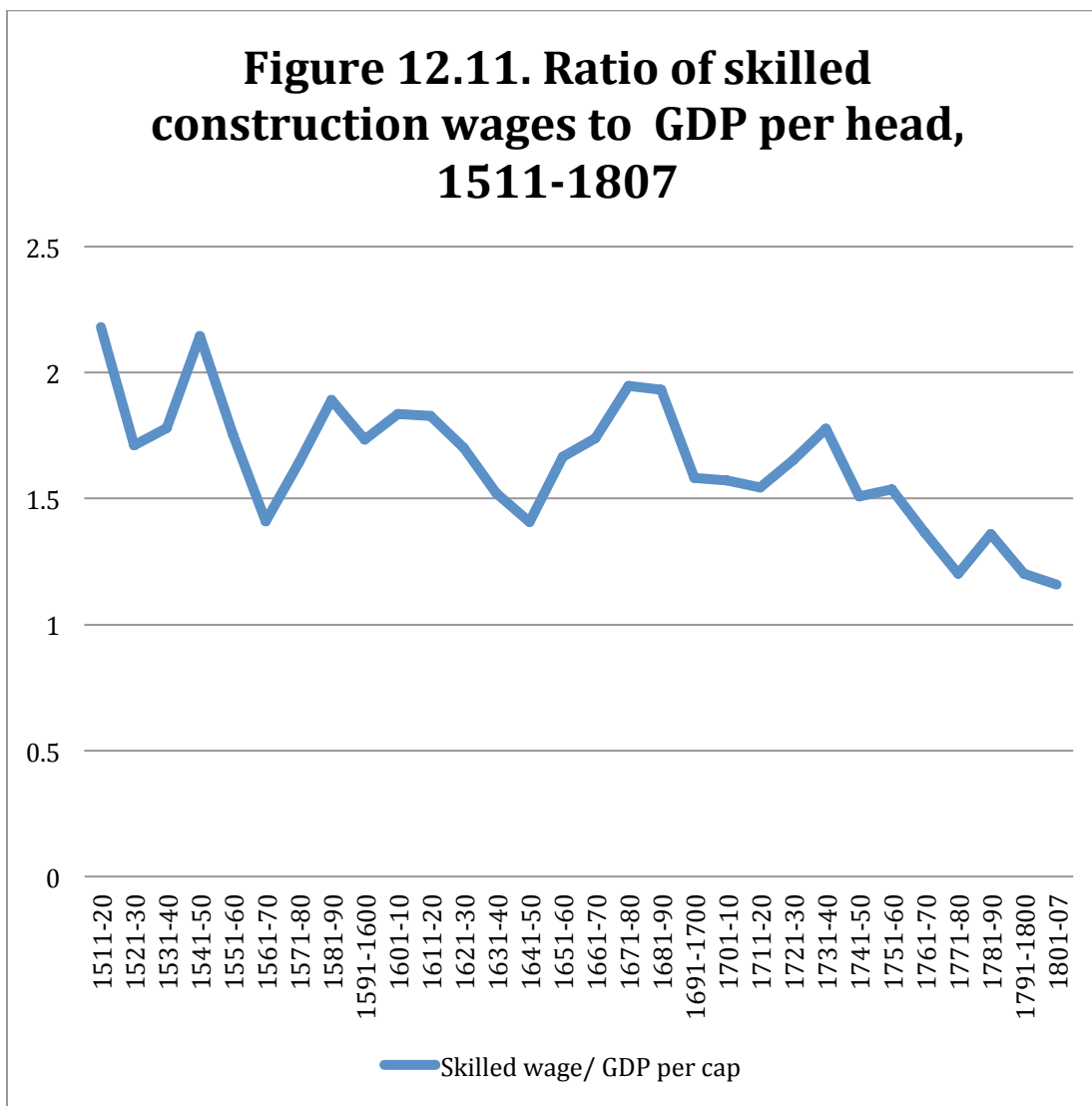
Sources: GDP per capita in Holland: Van Zanden and Van Leeuwen, Persistent; Skilled wage: as above.

There is much more to be learned about the factors that could cause daily wages and annual household earnings to diverge.[23] But the single most important factor underlying the trends we have uncovered in the long-term ratios of wages to salaries and wages to GDP is the growth over time on the supply of labor, whether through increases in hours worked per day, days worked per year, or participation of household members in the paid labor force.

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[23] The most important surely is the possibility that labor's share in total GDP – which is generally held to be fairly stable in the 60-80 percent range – might have moved decisively lower. This could occur if the returns to capital and land rise decisively, and would result, given the concentration of rental and capital incomes, in an increased inequality in the distribution of income.

What do these issues in the measurement of macro-level economic performance have to do with the price of bread and consumers' bread preferences? They help us make sense of the behavior of the early modern consumer. The puzzle is one I first pondered when studying consumer expenditures as revealed by probate inventories (showing ownership of consumer durables such as clothing and home furnishings) and import data for colonial groceries (such as coffee, tea, sugar, and tobacco). Households whose earnings as measured by wage rates did not rise rapidly, if at all, somehow managed to purchase growing amounts of these items in the seventeenth and eighteenth centuries.[24] For most consumers, these new "luxury" expenditures formed only a small part of their total budgets. But the puzzle intensifies when we contemplate consumer spending on bread, which was the largest single expense of most households.

The "wheat revolution" that unfolded in the Northwestern Europe in the seventeenth and eighteenth centuries involved a major increase of expenditure by the households that participated in it and in the Dutch Republic this expense grew even more because of its unique policy of heavy taxation on bread. Could it be that the new 'bread bundles' served to incentivize the deepening of commercial relations and the intensification of household economic activity even more than did the new "colonial groceries" of the same era. Did the industrious revolution have both a domestic and an "imperial" point of origin?

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[24] See Jan de Vries, "Industrial Rev and the Industrious Rev" Journal of Economic History 54 (1994), 249-70; Jan de Vries, "Between Purchasing Power and the World of Goods: Understanding the Household Economy in Early Modern Europe," in John Brewer and Roy Porter, eds., Consumption and the World of Goods (London, Routledge, 1993), pp. 85-132.

Table 12.1. Regional urbanization in the Netherlands, 1550-1840.
           (cities of at least 5,000 population)

	Holland	Zeeland Utrecht	Friesland Groningen	Overijssel Drenthe Gelderland North Brabant	National
1550	47				
1580	49	44	*31*	*29*	*42*
1620	57	54	30	29	45
1680	63	52	29	28	48
1750	66	48	29	24	42
1795	64	40	27	24	42
1840	59	34	24	24	38

[Tables 12.2 and 12.3 omitted from this paper]

Table 12.4. Indicators of rye bread costs in West and East.

	Price of 1 kg. rye bread/ price of 1 kg. rye		Purchasing power of wage labor Percentage of day wage needed to purchase 2.2 kg. of rye bread per day.		
	West	East	West	East	West as % of East.
1550-79	*1.00*	*1.00*	.460	.631	.729
1580-95	*1.00*	*1.00*	.324	.479	.652
1596-1604	0.996	0.919	.356	.506	.704
1605-19	1.219	1.044	.316	.421	.751
1620-39	1.172	1.000	.372	.438	.849
1640-59	1.268	1.035	.352	.382	.921
1660-79	1.351	1.094	.328	.345	.951
1680-99	1.566	1.159	.340	.352	.966
1700-19	1.494	1.072	.346	.322	1.075
1720-39	1.704	1.172	.292	.249	1.173
1740-59	1.528	1.037	.321	.283	1.134
1760-79	1.458	1.028	.355	.308	1.153
1780-99	1.401	1.003	.415	.384	1.081
1800-19	1.348	1.001	.530	.570	0.930
1820-39	1.442	1.094			
1840-54	1.389	1.101			

Table 12.5

A   Annual cost of 'bread bundles'

	B-R	B-RB-RB	B-RB-UWB	RB-UWB	RB-UWB-BWB	UWB-BWB
	50-50	33-67	33-33-33	50-50	33-33-33	50-50
1550-59	12.8725875	18.52839167	21.525725	26.976	32.97066667	38.216
1560-79	20.1785715	28.72904767	33.386381	41.916	51.23066667	59.381
1580-99	27.512595	39.21506333	45.58573	57.336	70.07733333	81.226
1596-1619	29.2054788	41.08878587	55.44910253	72.410525	91.50185	111.81775
1620-39	43.1031456	58.23782373	74.55360707	94.776325	118.8588833	143.137
1640-59	45.164493	62.68460533	82.33133867	105.4339	134.3954333	163.61125
1660-79	41.89042778	60.74335018	78.36920018	102.041225	136.4163167	166.82325
1680-99	41.90958225	61.54510483	82.59708817	109.348525	143.5630167	176.45925
1700-19	43.5935628	62.9218152	83.65259853	110.231825	140.6722167	171.4405
1720-39	35.4350025	54.81305167	73.20175167	98.08645	131.6384667	162.206
1740-59	39.2895819	58.22802793	78.0487446	103.165425	140.9131167	174.6525
1760-79	43.15735823	63.01920715	86.73447382	114.5881	156.0229	194.52675
1780-99	51.15112875	74.4401225	98.6907225	128.6406	174.0904	215.00325
1800-19	74.547675	102.9573667	129.8311	159.2349	200.5091	241.3015
1820-39	46.869975	73.88146667	85.36436667	106.03615	137.6074333	162.00525

B   annual cost as percentage of annual earnings of journeymen builders

	B-R	B-RB-RB	B-RB-UWB	RB-UWB	RB-UWB-BWB	UWB-BWB	avg path
	50-50	33-67	33-33-33	50-50	33-33-33	50-50	
1550-59	0.160959739	**0.231680313**	0.269159179	0.337309801	0.412267535	0.477855552	0.231
1560-79	0.200187492	**0.285015022**	0.331219476	0.415840086	0.508248994	0.589106789	0.285
1580-99	0.14415605	0.205472752	**0.238852742**	0.300419908	0.367179888	0.42559487	0.238
1596-1619	0.125330834	0.176326225	**0.237951322**	0.310738666	0.39266616	0.47984873	0.237
1620-39	0.147038357	0.198667494	0.254325751	**0.323311789**	0.405464953	0.488285228	0.323
1640-59	0.139587682	0.193736234	0.254457428	**0.325859381**	0.415369371	0.505665262	0.325
1660-79	0.115734047	0.167820529	0.21651688	0.281917483	**0.376888308**	0.460895983	0.376
1680-99	0.12011783	0.176395565	0.236733044	0.313405832	**0.411468621**	0.505753124	0.411
1700-19	0.127654646	0.184253397	0.244959167	0.322790881	**0.411929212**	0.502027704	0.411
1720-39	0.103515271	0.160123818	0.213842208	0.286537173	**0.384551731**	0.473847802	0.384
1740-59	0.11544618	0.171093788	0.229333807	0.303135173	**0.414050754**	0.513188559	0.414
1760-79	0.126555997	0.184799509	0.254342904	0.336021755	**0.457526468**	0.570436371	0.457
1780-99	0.145796236	0.212176934	0.281298502	0.36666474	**0.496210459**	0.612824495	0.496

| 1800-19 | 0.208662903 | 0.28818314 | 0.363404147 | **0.445706946** | 0.561235624 | 0.675415719 | 0.445 |
| 1820-39 | 0.125404615 | 0.197676165 | 0.228399643 | 0.283708763 | **0.368180424** | 0.433458863 | 0.368 |

In bold: proposed most common bread bundle in each period, summarized under "average path"

Table 12.6. Index of an unskilled laborer's real cost of acquiring breads and bread grains in two periods. (Index 1580-99=100; 1680-99 = 100)

		1580-96 / 1680-99	1680-99/ 1780-99
Buckwheat,	810 kg	76	136
Rye,	810 kg	91	118
Rye bread,	803 kg	104	114
Coarse wheat bread,	803 kg	122	119
Fine white bread,	803 kg	128	127