

Tax Effects on Work
Activity, Industry Mix
and Shadow Economy
Size: Evidence from
Rich-Country
Comparisons

Steven J. Davis
Magnus Henrekson

Overview

Substitution Margins: Taxes on labor income and consumption expenditures encourage households to substitute away from market production towards

- leisure
- household production
- underground (shadow) activity

Empirical Approach: Relate employment, market work hours, shadow economy size, and industry mix of market activity to tax rate differences among rich countries.

Objective: Assess the long run “total response” to differences in tax rates on labor income, payrolls and consumption.

- “Total response” = direct LS and LD effects plus indirect effects that involve government spending responses to available tax revenues.

Why Cross-Country Variation?

Obvious Limitation: Few observations

Another Issue: Empirical relationship between tax rates and outcomes can vary with reason for tax differences.

Attractions:

1. Captures combined effect of taxes working through LS and LD channels.
2. Captures indirect effect of taxes working through govt. expenditures.
3. Large, highly persistent differences in tax rates among countries → useful for estimating long run response:
 - a. Slow-working LD & LS responses
 - b. Welfare-state dynamics
 - c. Shadow economy development
4. Useful input for assessing performance of economic theory and success or failure of tax policy

Background

- 1. Home production sector is big**
 - a. 24 - 48% of official GNP in US
 - b. Time in home production =
2/3 of market work time for typical U.S. married couple

- 2. Underground sector is big**
 - a. 16% of official GDP average OECD country, according to Schneider and Enste (2000) as of mid 1990s
 - b. Range: 7% to 25% +
 - c. Tax sensitive

- 3. Bigger Tax Effects in LR**
 - a. Slow factor migration
 - b. Welfare-state dynamics
 - i. Economic mechanisms
 - ii. Erosion of social norms →
delayed response to incentives

Personal Taxes and Choice of Production Sector

$$C_H = W^B (1-t)H^B \quad (1)$$

$$C_M = W^P (1+s)(1+m)H^P \quad (2)$$

$$C_H > C_M \Leftrightarrow \frac{W^B}{W^P} \frac{H^B}{H^P} > \frac{(1+s)(1+m)}{1-t} \quad (3)$$

I.e., market provision dominates when the professional's comparative advantage – his relative productivity times the buyer's relative wage – exceeds the tax factor.

For given tax rates, the comparative advantage ratio, $(W^B/W^P)(H^B/H^P)$, determines task assignment and time allocation.

Taxes distort task assignment and time allocation.

New Effects with Capital

- Absolute advantage and capital intensity now affect choice
- Team production requirements (simultaneous application of cooperating factors) deter home production
- VAT and business-level taxes on capital income can raise or lower relative capital costs of a do-it-yourself approach, depending on whether capital services are produced at home or in the market sector
- Capital idleness in home sector

Empirical Implications

1. Personal taxes cause productive activity to migrate from the legal market sector to the household sector and the untaxed shadow economy.
2. The following technology features deter tax-induced substitution away from market provision:
 - a. Big comparative or absolute advantage for professional (high skill intensity and specialization)
 - b. High capital intensity
 - c. Big capital idleness effect
 - d. Team production (predominance of big firms and establishments)

- 3.** Personal taxes alter the structure of labor demand in ways that amplify negative effects on hours worked and employment.
- a.** Greater skill intensity (big absolute and comparative advantage) implies less scope for tax-induced substitution.
 - b.** High capital intensity implies less scope for substitution, and capital and skill tend to be complements.
 - c.** Skill intensity rises with employer size, so team production effect works in the same direction.
 - d.** Empirical studies typically find that labor supply is more elastic for less skilled workers.
 - e.** (a)-(c) imply that personal taxes reduce the relative demand for less skilled workers. (d) says that less skilled workers are more responsive to labor demand shifts.

4. Tax-responsive industries:
 - a. Personal services
 - b. Domestic household services
 - c. Cleaning and laundry services
 - d. Eating and drinking
 - e. Lodging
 - i. Intensive use of less skilled
 - ii. Many small-scale establishments
 - iii. Capital intensive, but many households have underutilized living space
 - f. Retail trade
 - i. Small establishments common
 - ii. Labor not highly skilled or spec.
 - iii. A mix of inventory services (capital intensive) and customer services (labor intensive)
 - iv. High tax elasticity in customer services?
 - g. Child and elderly care
 - i. Large subsidies to market provision in many countries
 - ii. Lack of suitable tax measures

Table 2. Average Personal Tax Rates by Country and Decade

Country	1960s	1970s	1980s	1990-95	Deviation from Mean in 1970s	Deviation from Mean in 1990s
Australia	29	35	39	.	-10	-11
Austria	49	55	59	59	11	9
Belgium	41	44	46	50	-1	-1
Canada	34	42	43	51	-3	0
Denmark	37	53	60	59	9	9
Finland	41	54	60	64	9	13
France	56	59	65	67	15	17
Germany	43	47	50	53	3	2
Ireland	26	32	38	40	-13	-10
Italy	57	55	57	68	10	18
Japan	24	26	34	31	-18	-19
Netherlands	50	56	55	45	12	-5
New Zealand	.	29	31	.	-15	-19
Norway	49	60	65	60	16	10
Portugal	.	26	35	40	-19	-10
Spain	22	28	41	47	-16	-4
Sweden	47	65	78	77	21	26
Switzerland	30	324	36	35	-10	-15
United Kingdom	38	45	51	47	1	-4
United States	35	42	44	45	-3	-5
<i>Simple Mean</i>	38	44.2	49.3	50.3		

The 5-year changes in the simple mean of the average personal tax rates for the countries listed in the table are as follows:

Interval	1960-65	1965-70	1970-75	1975-80	1980-85	1985-90	1990-95
Change	3.0	5.3	1.4	3.2	3.0	1.4	-.4

Figure 1: Tax Rates and Annual Work Hours Per Adult
Sample D: 14 Countries in 1995

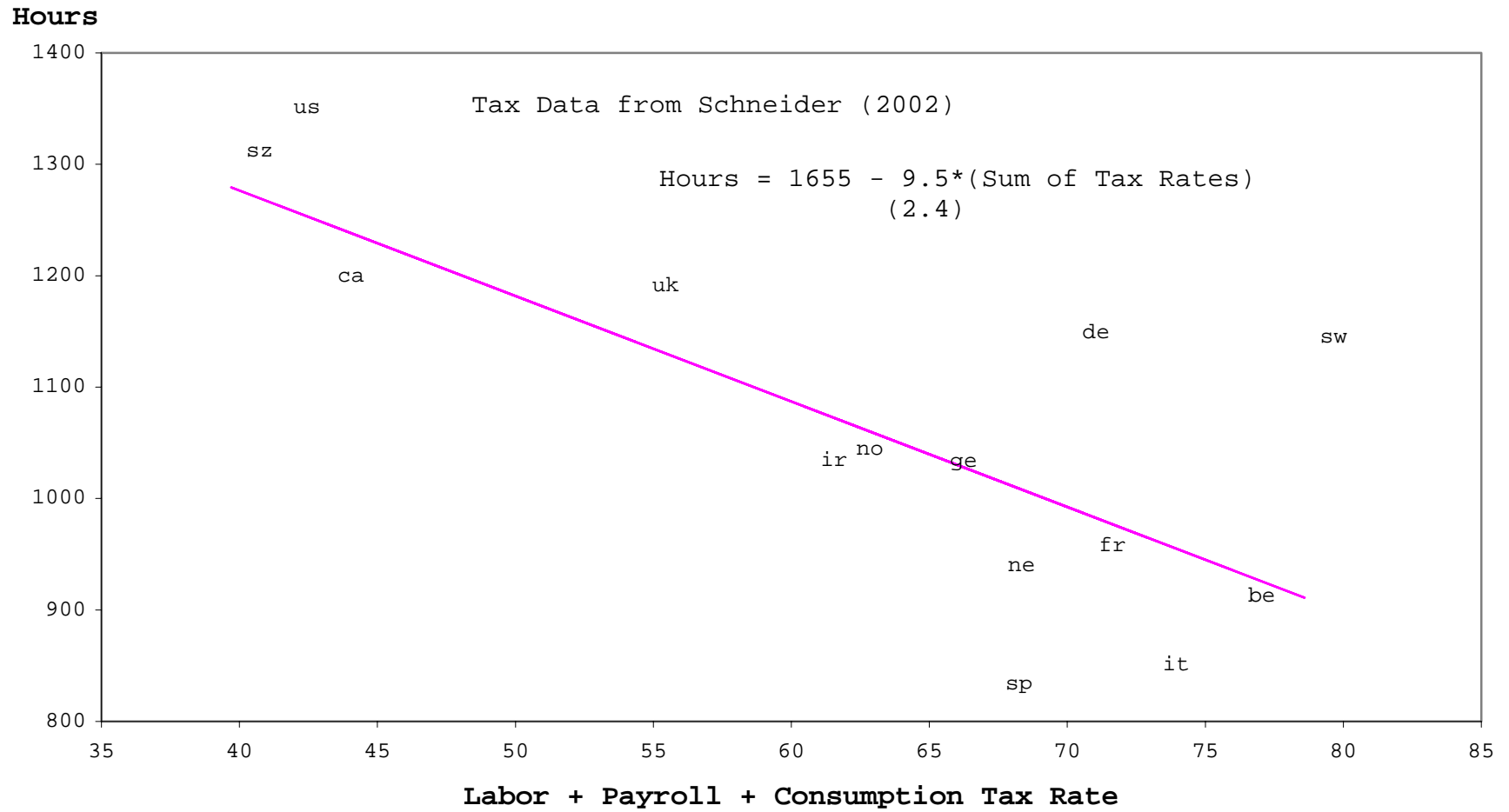


Figure 2: Tax Rates and Annual Hours Per Employed Person
Sample A: 13 Countries with Data for 1977, 1983, 1990 and 1995

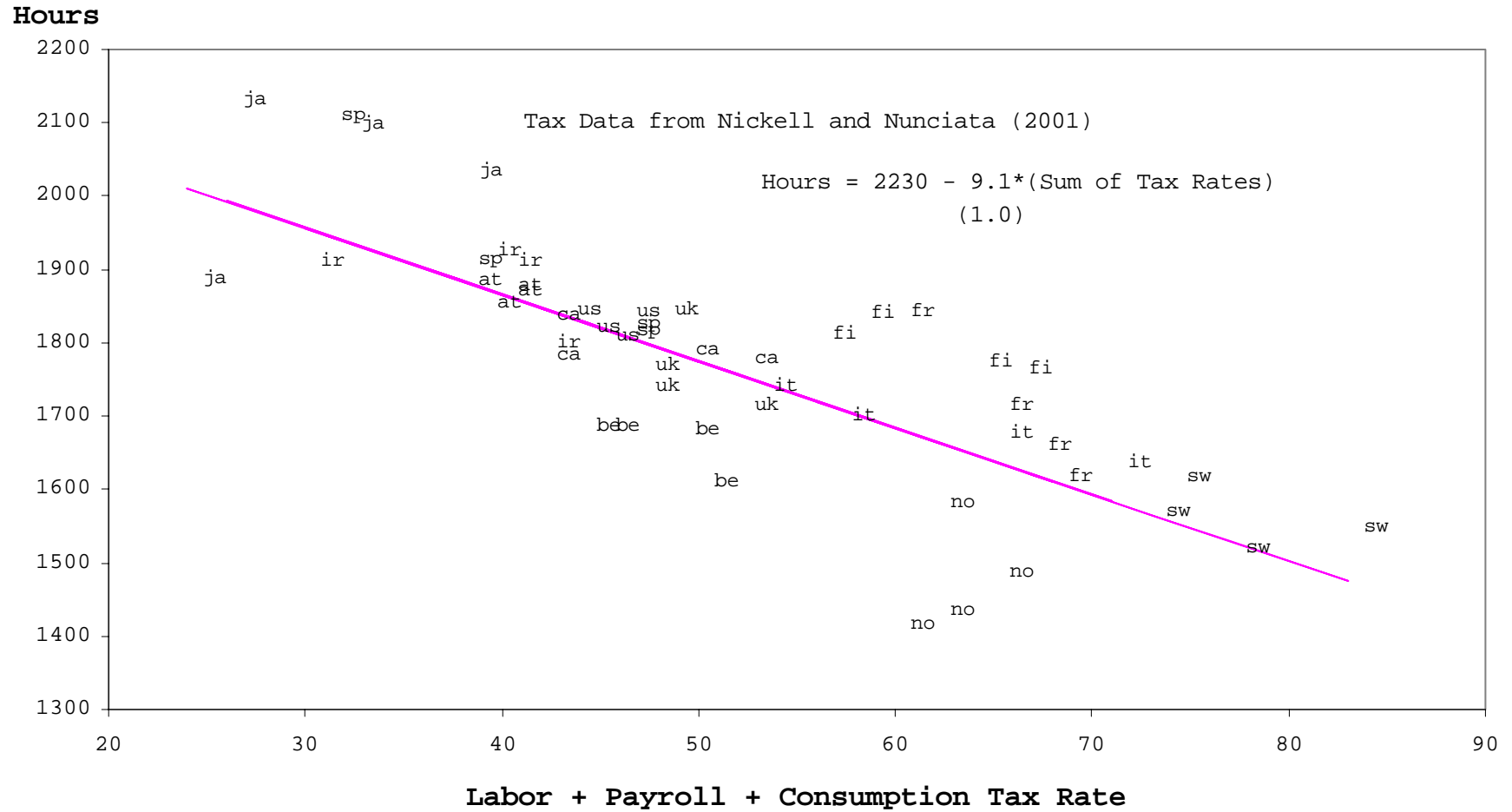


Figure 3: Personal Taxes and Industry Employment Shares, 1995

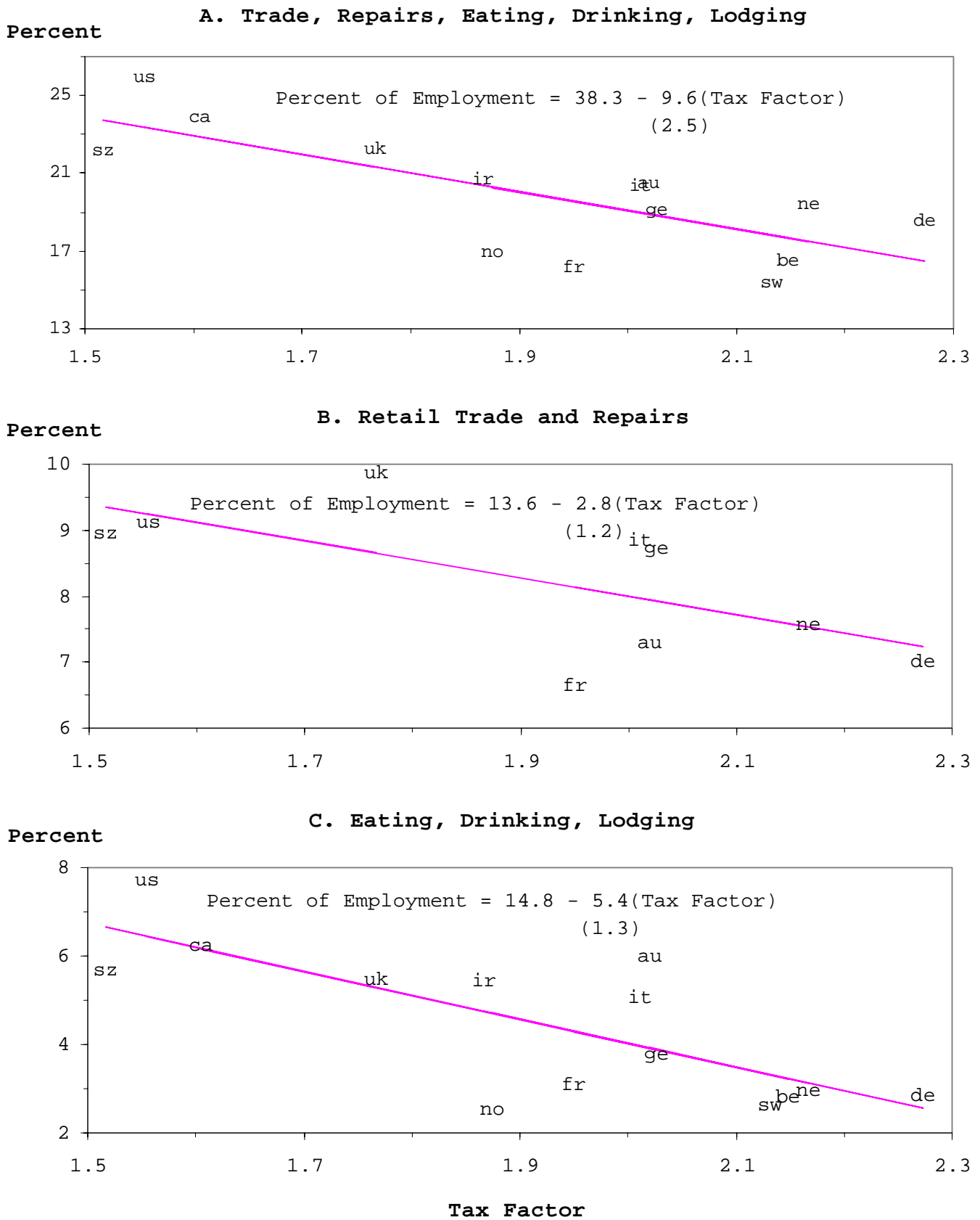


Figure 4: Personal Taxes and Value Added Shares, 1995

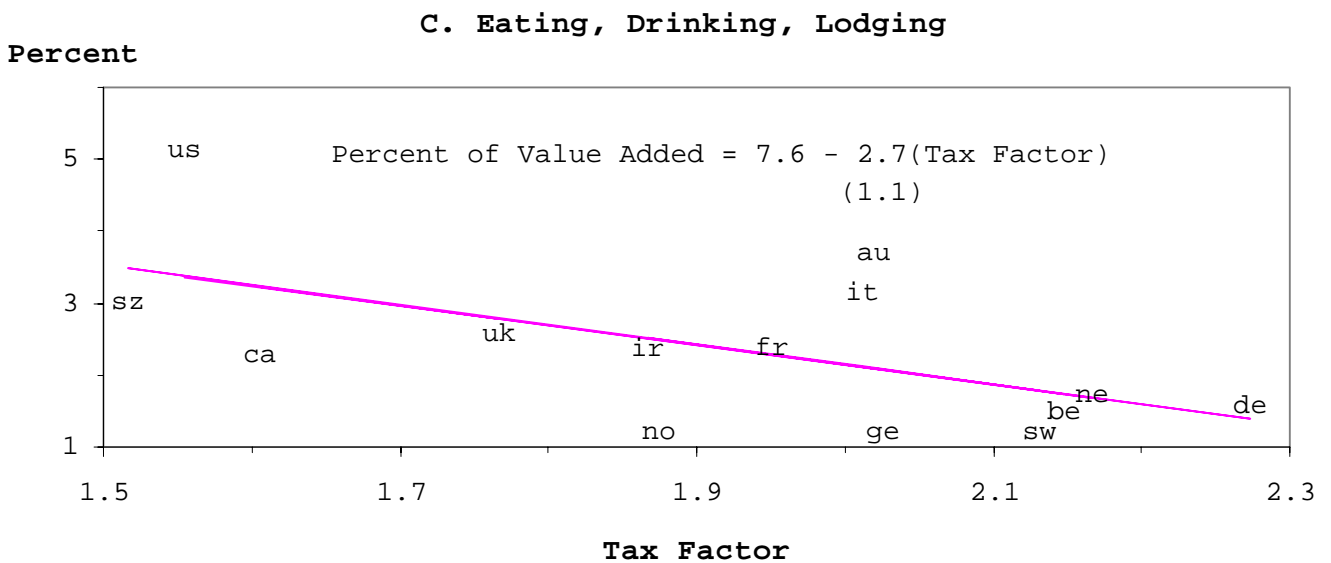
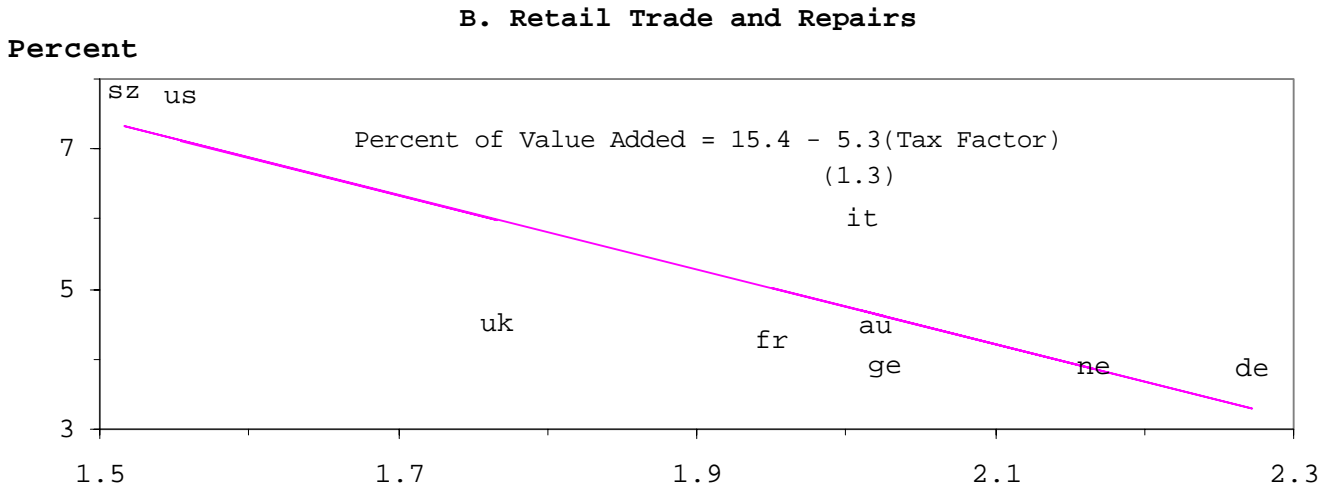
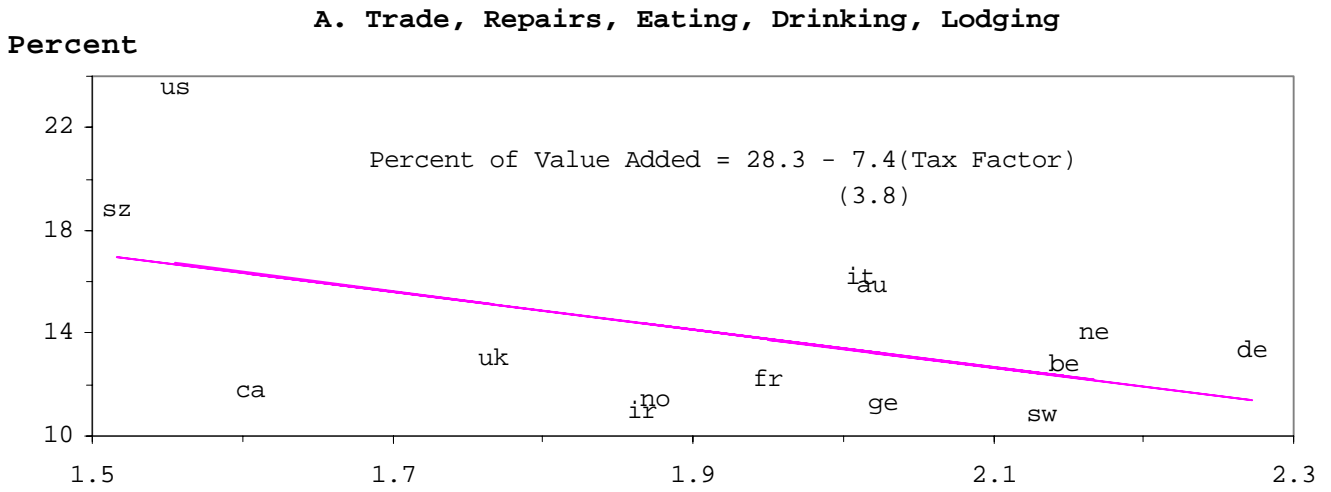
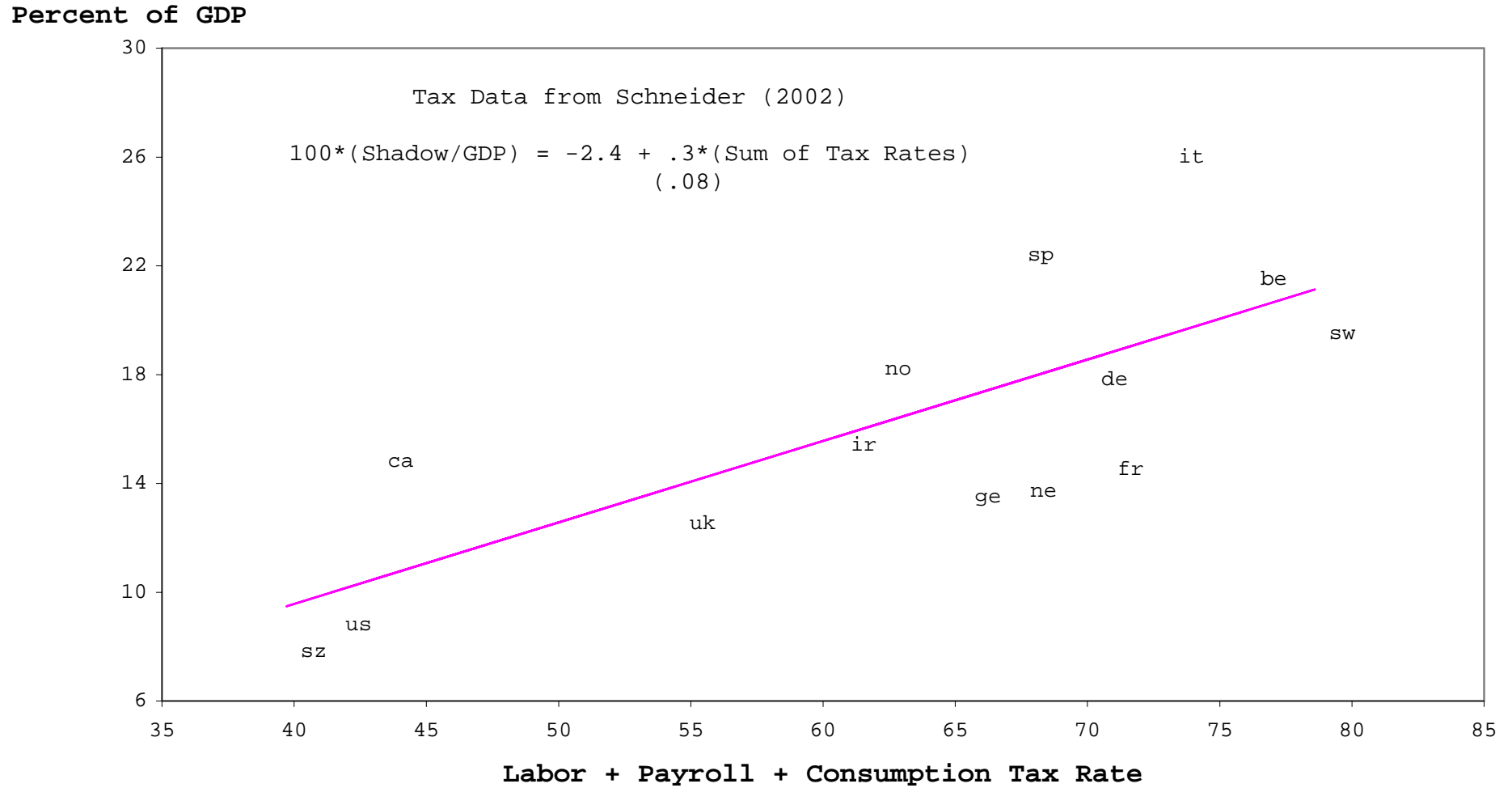


Table 6. Labor Skill Measures for Selected Industries, U.S. Data, 1985-1987

<i>Industry</i>	<i>(1) Mean Hourly Wage, Log Dev. from Average (X 100)</i>	<i>(2) Hourly Wage Rank</i>	<i>(3) Mean Years of Schooling, Deviation from Average</i>	<i>(4) Years of Schooling Rank</i>
Wholesale Trade	4	28	.03	28
Retail Trade	-28	51	-.38	38
Automotive & Miscellaneous Repair Services	-19	49	-1.15	52
Hotels&Lodging Establishments	-36	53	-.94	47
Eating&Drinking Establishments	-51	60	-1.16	54
<i>Range</i>	108 log points	1 to 61	4.9 years	1 to 61
<i>Between-Industry Standard Deviation</i>	25 log points		1.2 years	

1. Column (1) reports the difference between the hours-weighted mean of the log hourly wage in the indicated industry and the average over industries of the log hourly wage. There are 61 industries that cover the entire economy. Column (3) reports the difference between the hours-weighted mean years of schooling in the indicated industry and the average over industries of mean schooling years. Years of schooling is based on the highest grade completed.

Figure 5: Tax Rates and Shadow Economy as Percent of GDP
Sample D: 14 Countries in 1995



Controls for Other Policies and Institutions

- Minimum Wage Laws
- Collective Bargaining Institutions
- Job Security Provisions
- Product Market Regulations that impede entry and hamper competition

How do controls for these policies and institutions affect the estimated tax effects in the cross-country regressions? (Table 8)

- The magnitude of the estimated tax effects is highly similar to previous results (for the Schneider tax data)
- None of the controls show a pattern of statistically significant tax effects on the outcome variables.
- Sensitivity to tax rate measure: Using the Nickell-Nunciata data, there is no evidence of statistically significant tax effects when controls are included.

Other Evidence

1. Canada's 1990 switch from 13.25% sales tax on mfg goods to broad-based consumption tax at 7% rate:
 - a. Food dollars spent at restaurants fell from 42% to 35% (Piggot and Whalley, 2001)
 - b. Led to sizable increase in underground activity (Karoleff et al., 1994, and Spiro, 1993)
2. Big gap in female employment rates between high-tax Germany and low-tax U.S. (Freeman and Schettkat, 2002)
 - a. German women actually work as many hours as US women after accounting for household work.
 - b. Cleaning and cooking account for major part of extra household work by German women
 - c. Expenditure shares on restaurants and personal services much lower for Germany

3. Hours worked in the market sector is 10% lower for Swedes than Americans, but total work time inclusive of household work is only 1% lower (Olovsson, 2004, and Juster and Stafford, 1991).
4. Food expenditures fall by 17% at retirement for American households, but food *consumption*, as measured by the nutritional content of food intake and the income elasticity of different foods and dining experiences, does *not* drop at retirement (Aguiar and Hurst, 2004).
5. Tax evasion is relatively prevalent in retail trade, restaurants, and hotels (Skolka, 1985, and Giles, 2000).

Summary and Concluding Remarks

1. We relied on large size and persistent character of tax rate differences among rich countries to draw inferences about long run tax effects.

2. Cross-country regressions with preferred tax measure show that a unit st. dev. tax hike of 12.8 percentage points leads to
 - a. 122 fewer hours of market work per year per adult
 - b. 4.9 percentage point drop in the emp./pop. ratio
 - c. increase in shadow economy size amounting to 3.8% of GDP
 - d. 10-30 percent smaller value added and employment shares in Retail Trade and Repairs; Eating, Drinking, Lodging; and in a broader category that includes Wholesale and Motor Trade.

3. Results are sensitive to tax rate measure – bigger and more robust effects using tax rates for “average” worker (Schneider) than rates computed from NI accounts (Nickell-Nunciata).

4. Other evidence also points to important substitution responses to personal tax rates:
 - a. Tax effects on work time in the household sector
 - b. Tax effects on the composition of consumption expenditures
 - c. Industry differences in tax evasion rates

5. Our estimated tax effects are *not* pure labor supply responses. Instead, they reflect tax effects that operate through several channels:

- a. Direct effect on labor supply
- b. Twist in labor demand away from workers with relatively elastic labor supply
- c. Expenditures on government programs that discourage LS

6. Many substitution margins:

- a. Market work hours worked per employed person
- b. Market employment rate
- c. Industry mix of market activity
- d. Size of shadow economy
- e. Time in household production
- f. Mix of expenditures on market goods