Optimal Income Taxation and the Labour Market: An Overview

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Potentially Relevant Margins of Decision-Making

- Labour supply (intensive margin)
- Participation (extensive margin)
- Job choice (different skills, risks, attractiveness)
- Occupational choice (entrepreneurship)
- Mimicking income/earnings (when they differ from ability)
- Search and involuntary unemployment
- Shirking/quit (efficiency wage)
- Education/human capital investment/training
- Household vs market production (secondary earners)
- Underground economy
- Migration/immigration
- Fertility
Catalogue of Labour Market Agents

- Full-time employed
- Part-time employed
- Involuntary unemployed
  - Temporarily laid-off
  - Permanently laid-off (displaced workers)
  - Unable to find a first job
  - Unable to work due to disability
  - Care-givers (of children, disabled, elderly)
- Voluntary unemployed
  - Non-participants (primary and secondary earners)
  - Retired
  - Youth
- Investing in human capital
- In underground economy
- Employers
Classes of Tax-Transfer Programs

- Income tax system
- Refundable tax credits
- Unemployment insurance
- Pensions
- Disability pensions
- Welfare/social assistance

Important Distinction between Programs

- Taxes and transfers delivered through the income tax system: Administered by self-reporting and ex post audit-penalties
- Standalone transfers: Subject to initial eligibility by tagging/monitoring and continuing monitoring for compliance, with threat of losing transfer
- Possibility of errors and agency problems in both, and commitment problems
The Mirrlees ’71 Benchmark Model

- Supply-side model: Perfectly elastic demand for labour
- Exogenous skills, known only by workers and employers
- Workers of different skills perfect substitutes
- Labour supply varies by work effort: intensive margin
- Full employment of willing workers
- Voluntary unemployment due to minimum-income constraint or bunching at bottom

**Standard results**

- \( 0 < T'(y) < 1 \) in interior
- \( T'(y) = 0 \) at ends, unless bunching or maximin, or finite types
- \( T(y) < 0 \) at bottom
- \( T'(y) \) decreasing, \( T(y)/y \) single-peaked under maximin
- If \( \bar{w} \rightarrow \infty \), possibly U-shape \( T'(y) \) above median (Diamond ’98)
Extensions to the Standard Mirrlees Model

- Heterogeneous Preferences
  - Interpretation of different preferences for leisure (Cuff '00)
  - Possibility of $T'(y) < 0$, $T(y)/y \downarrow$ (incentives bind upward)
  - Equality of opportunity: Compensation versus responsibility

- Multiple Goods and Indirect Taxation
  - Atkinson-Stiglitz ’76 Theorem
  - Higher taxes on goods complementary with leisure
  - Generalization to non-optimal income tax (Konishi ’95, Laroque ’05, Kaplow ’06)
  - Optimal linear income tax (Deaton ’79)
  - Preferential taxation of necessities if income tax rate sub-optimal

- Evasion
  - Typically assume revelation principle applies
  - Income variable: Cremer-Gahvari ’96
  - Income fixed: Redistribution severely compromised (Chander-Wilde ’98)
  - Mistakes in auditing or filing: Optimal to punish the innocent
Extensions, cont’d

- Production Efficiency Theorem (Diamond-Mirrlees ’71)
  - No taxes on producers: Case for VAT
  - Cost-benefit analysis: Producer prices as shadow prices in public sector (Little-Mirrlees ’74)
  - VAT vs trade taxes in LDCs (Keen ’08 vs Emran-Stiglitz ’05)

- Other Policy Instruments
  - Quantity and price controls welfare-improving in second-best (Nichols-Zeckhauser ’82, Guesnerie-Roberts ’84)
  - In-kind transfers (big literature): Dominate subsidies
  - Workfare (Besley-Coate ’92, Cuff ’00): May be welfare-improving if less onerous to targeted workers
  - Minimum wage affecting hours of work (Guesnerie-Roberts ’87, Allen ’87): Not welfare-improving
  - Minimum wage and unemployment (Broadway-Cuff ’01): Welfare-improving if workers must accept jobs offered
Workers of Different Skills Imperfect Substitutes

Stiglitz ’82 argument for two-type case

- Relative wage $w_1/w_2$ increasing in relative labour supplies $L_2/L_1$
- $T'(y_2) < 0$ for high-skilled to improve relative wage of low-skilled

- Multiple-goods case (Naito ’99)
  - Differential tax on most skill-intensive good increases $w_1/w_2$

- Production efficiency (Naito ’99)
  - Increase public sector demand for unskilled labour to increase relative wage
  - Violation of production efficiency
  - But, assumes public sector observes skills
Skill-Specific Jobs: Diamond ’80 Base Case

Pure extensive-margin model
- Workers differ by both skill and disutility of work
- Perfectly elastic supply of jobs for each skill level
- Income and effort per job fixed (and increasing in skill)
- Workers choose whether to participate in job for own skill level
- Government can observe skill (= earnings) of those working, not of non-participants
- Possibility of negative marginal tax rate at bottom (EITC)
- Possible discontinuity at bottom if low-skills do not participate (negative participation tax for lowest-wage workers)

Empirical evidence for extensive margin (Saez ’10)
- Intensive response implies bunching at budget kinks
- Limited bunching at kink points except for self-employed
Participation & Occupational Choice: Saez '02

- Workers can participate or not
- Participation can be in job for own skill or next lower skill
- Choices determined be preferences for leisure
  - With participation decision only, negative participation tax rates at lower skills, and negative marginal tax rate at low-skill levels (unless maximin)
  - With occupational choice only, standard pattern of marginal tax rates (all positive)
  - With both participation and occupational choice, marginal tax rate at bottom depends on relative size of participation and occupational choice elasticities
  - Additional margins reduce optimal marginal tax rates
Both Intensive & Extensive Margins

- Extension by Saez ’04 to allow choice of occupations (long run) and hours worked (short run): undoes Naito ’99 arguments for taxing skill-intensive goods and public employment of low-skilled workers.

- Song ’11 model of job choice with intensive margin:
  - Each skill most productive at own job, & earnings rise with skill
  - Mimicking of low-skilled by less-productive high-skilled: $T'(y) < 0$

- Jacquet-Lehman-Van der Linden ’10 add participation to Mirrlees ’71:
  - Participation tax rates can be negative at low $y$
  - $T'(y) \geq 0$, & reduced progressivity

- Boone-Bovenberg ’04: Mirrlees ’71 & participation via costly search:
  - Non-participants at lower end
  - Exogenous transfer $b$ for voluntary & involuntary unemployed
  - $T'(y) > 0$ at bottom, unless $b$ small
Applications of Extensive-Margin Approach

- Taxation of couples: Jacobsen Kleven-Kreiner-Saez ’09
  - Primary earners vary in $w$ and choose labour supply
  - Secondary earners choose participation for fixed income
  - If secondary earners differ in market productivity, positive participation tax & negative jointness
  - If secondary earners differ in home productivity, negative participation tax rate & positive jointness

- Household sector: Beaudry-Blackorby-Szalay ’09
  - Different productivity in market and non-market activities
  - Government observes $y$ & $w$ in market sector
  - $\tilde{w}$ such that $T(y), T'(y) > 0$ for $w > \tilde{w}$, and vice versa

- Two-period two-type model: Diamond-Spinnewijn ’10
  - Workers take job suited to skill, utility discount factors differ
  - If preference for work↑ with discount factor, tax saving

- Retirement decision: Cremer-Lozachmeur-Pestieau ’04
  - Nonlinear income tax and age-contingent pension
  - Less productive and less healthy retire earlier
  - Pension incentive for early retirement relaxes incentive constraint on low-skilled, less healthy (cf. Mirrlees Review ’11)
Occupational Choice: Entrepreneurship

- Kilstrom-Laffont ’79, Kanbur ’81
  - Less risk-averse individuals become entrepreneurs
  - Inefficiencies: risk-sharing; size and number of firms
  - Government role in encouraging risk-taking & entrepreneurship

- Boardway-Marchand-Pestieau ’91: Heterogeneous abilities
  - Higher-ability individuals become entrepreneurs
  - Linear progressive income tax for insurance & redistribution

- Boardway-Marceau-Marchand-Vigneault’98: Asymmetric info in credit and labour markets
  - Credit-rationing distorts occupational choice
  - Efficiency wages induces less entrepreneurs
  - Wage subsidy can increase entrepreneurship

- Berry-Cullen-Gordon ’07: Effect of business tax
  - Incorporate only when firm generates profits
  - Taxation of profits↓, entrepreneurship↑

- Asymmetric information & entrepreneurship
  - Venture capital & moral hazard (Keusshnig-Neilsen ’03, ’04)
  - Credit markets with ex ante monitoring (Boardway-Sato ’99)
  - Adverse selection of labour (Boardway-Sato ’11)
Minimum Wage with Extensive-Margin Variation

- Marceau-Boadway ’94
  - Intensive-margin model with participation choice
  - $w$ induces layoffs in low-wage firms
  - $w$ welfare-improving as long as participation choice binding
  - Welfare improvement greater with unemployment insurance
  - Assumes enforcement of $w$ (government can’t observe $w$)

- Lee-Saez ’08
  - Extensive-margin model so all wages observed
  - Participation decision due to different tastes for leisure
  - $w$ causes involuntary unemployment
  - If layoffs assigned to those with highest preference for leisure, $w$ is welfare-improving

- Boadway and Cuff ’99
  - Model with voluntary and involuntary (frictional unemployment) and costly monitoring
  - UI imperfect because of imperfect monitoring
  - $w$ welfare-improving if UI sufficiently inadequate
Endogenous Skills

- Learning by doing: Krause ’09
  - Two-period model: future $w$ depend on current $\ell$
  - With commitment:
    \[ T'(y_2^1) = T'(y_2^2) = 0, \ T'(y_1^2) > 0, \ T'(y_1^1) \geq 0 \]

- Human Capital Investment
  - Bovenberg & Jacobs (various): Endogeneity of human capital reduces progressivity: subsidize human capital $I$ & tax $K$
  - Anderberg '09: Uncertain return to human capital $I$; Tax human capital if it increases wage risk, & vice versa

- Education: redistributing via education inefficient
  1. Heterogeneity in education productivity: regressive education spending increases size of the pie (Hare-Ulph ’79)
  2. More equal wages tighten incentive constraint and increases distortionary cost of taxation (Krause ’06)
  3. With identical education productivity & constant returns to education, surplus from education maximized by concentrating spending on fewest persons: Cremer-Pestieau-Racionero ’11

Use education to maximize surplus, & redistribute income ex post
Involuntary Unemployment I: Inability to Work

- Tagging for inability to work with participation decision
  - Akerlof ’78: The classic reference on tagging
  - Parsons ’96: Simple application to able & disabled
  - Stigma: Jacquet and Van der Linden ’06
  - Take-up & complexity: Jacobsen Kleven-Kopczuk ’11

- Aside: Tagging with optimal income tax
  - Immonen-Kanbur-Keen-Tuomala ’98: $T'(y)$ ↑ with $w$ in higher-$w$ group, ↓ in lower-$w$ group
  - Boadway-Pestieau ’06: Income tax more progressive in high-average-skill
  - Banks-Diamond ’10: Age-dependent taxation (no horizontal equity issue here)
  - Cremer-Gahvari-Lozachmeur ’10: Gender tagging calibrated for US; high-skilled males lose
  - Alesina-Ichino-Karabarbounis ’11: Gender-based tax: $T'(y)$ higher for males ($\ell$ more elastic)
  - Mankiw and Weinzierl ’10: Height-based taxation
Involuntary (Permanent) Unemployment II: Search

- Boone-Bovenberg ’02
  - Optimal labour taxation with scarce entrepreneurs: endogenous demand and supply for labour
  - Workers and entrepreneurs homogeneous: no redistribution
  - Tax raises revenues, corrects search externalities, and occupational choice

- Broadway-Cuff-Marceau ’03
  - Tax-transfer policy in a search model with three types of unemployed: disabled, voluntary unemployed, involuntary unemployed
  - Extensive-margin model with unobservable preferences for leisure
  - Government observes types, not preferences for leisure
  - Wages determined by competitive wage-setting
  - Employment tax/subsidy corrects search externalities
  - Efficiency-wage version studied
Involuntary (Permanent) Unemployment II: Search, cont’d

- Hungerbühler-Lehman-Parmentier-Van der Linden ’06
  - Extensive-margin model
  - Matching technology for each skill; Nash wage bargaining; Hosios condition satisfied
  - $T'(y)$ affects bargaining; $T(y)/y$ affects participation
  - Government observes $w$, not skill $a$: incentive constraint on wage bargains
  - Government cannot distinguish involuntary unemployed from non-participants: gives $b$ to both
  - Uniform value of inactivity $d$: all $a < a_d$ do not participate
  - Participation tax $> 0$; $T(y)/y$ increasing; $T'(y) > 0$ for all $w$
  - Numerical simulations: $T'(y)$ twice as high as Mirrlees

- Lehman-Parmentier-Van der Linden ’11
  - Extend HLPV ’06 to heterogeneous value of leisure
  - Maximin solution: $T'(y) > 0$ everywhere; $T(y)/y \uparrow$ when elasticity of participation falls with ability
  - Simulations for general case: $T'(y) > 0$ at top, can be $< 0$ at bottom; can be participation subsidy at bottom (EITC)
Involuntary (Permanent) Unemployment II: Search, ended

- Jacquet-Lehman-Van der Linden '11
  - Extensive labour model with skill-specific search
  - Workers differ in skills and cost of search
  - \( w \) determined by given division of surplus: Leontief objective
  - No incentive constraint imposed
  - Optimal participation tax is ratio of equity effect to efficiency effect involving demand & supply elasticities for each \( a \)

- Engström-Holmlund-Kolm '05, Holmlund '02: Home production
  - Labour taxation with home production and search unemployment
  - Services produced in market or home; goods only produced in market
  - Unemployed allocate time between home production and job search
  - Optimal tax lower in service sector than in goods sector
Search & Temporary Unemployment: Unemployment Insurance (UI)

- Search models more suited to study frictional or structural unemployment than long-term unemployment.
- Insurance a primary objective rather than redistribution.
- Large literature on UI and search: Focus on replacement rate and duration.
- Most concerned with optimal UI with moral hazard effects on turnover, duration, etc.: optimal duration, replacement rate, experience rating (e.g., Coles ’08).
- Recent emphasis on private market failure and limited self-insurance (liquidity constraints).
- Efficiency emphasized rather than equity.
- Actual UI programs a mix of insurance and redistribution (needs-based, general-revenue finance).
Unemployment Insurance & Search: Key Results

- **Moral hazard versus liquidity**
  - Chetty ’08: Search model of unemployment with incomplete markets for insurance and credit
  - UI affects job search effort through two channels: Moral hazard and liquidity (C-smoothing)
  - Liquidity effect is welfare-improving; moral hazard is welfare-reducing
  - Crossley-Low ’11: Life-cycle UI (liquidity constraint falls with age)

- **Chetty-Saez ’10**
  - Optimal UI↓ by implicit private UI (e.g. severance)

- **Spinnewijn ’10**
  - Benefit of UI↑ if unemployed overestimate chances of getting job, and underestimate returns to search

- **Acemoglu-Shimer ’99**
  - UI induces search for high-wage, high-risk jobs
  - Firms invest in such jobs so, $K/L$↑ and output↑
Unemployment Insurance & Search: Key Results, cont’d
Mortensen-Pissarides ’03

- Dynamic search model with workers of different skills
- Study job creation subsidy, implicit firing tax, linear wage tax, employment subsidy, UI
- Important assumptions
  - Shocks independent of skill of worker
  - Separate matching for each skill group
  - Cost of job posting, creation & termination $\propto$ skills
  - Value of home production independent of skill
  - Wages determined by Nash bargaining
- $w$ and employment rate higher for high-skilled
- Results of simulations
  - Wage and employment subsidies increase low-skilled employment and wage
  - Job creation or hiring subsidy reduces duration and increases unemployment incidence; ambiguous effect on employment
  - Employment subsidy for low-skill workers financed by payroll tax increases employment and wage of low-skilled
Unemployment Insurance, Search & Monitoring

- **Broadway-Cuff ’99**
  - Matching/search model of unemployment
  - Level of UI increasing in monitoring for job search and job acceptance: two types of monitoring complementary
  - Monitoring random and error-free

- **Boone-Fredriksson-Holmlund-van Ours ’07**
  - Also examine how monitoring and sanctions of search effort by unemployed individuals can be used in design of UI, although not in optimal income taxation setting

- **Fredriksson-Holmlund ’06: Add heterogenous preferences and workfare**
  - Compare effectiveness at increasing search intensity of a) limits on the duration of benefits, b) monitoring search effort and c) workfare
  - Monitoring of search effort and sanctions is most effective way to increase search: leads to higher benefits
Unemployment Insurance, Search & Minimum Wage

- **Broadway-Cuff ’99**
  - Search model with imperfect UI because of costly monitoring
  - Small minimum wage welfare-improving if transfer to low-wage employed is large enough relative to UI benefit

- **Hungerbühler-Lehmann ’09**
  - HLPV ’06 model with worker bargaining power ($\beta$) less than elasticity of matching function with respect to $U (\gamma)$
  - Constant benefit of leisure $d$
  - No monitoring so $b$ paid to both voluntary and involuntary unemployed
  - Incentive constraint applies to worker-firm choice of $w$
  - Low-skilled workers choose not to participate
  - Minimum wage $w$ applies to outcome of bargaining, so observable (equivalent to very high tax on wages below $w$)
  - Binding minimum wage optimal if $\beta < \gamma$, unless government can control $\beta$
Involuntary Unemployment III: Efficiency Wage

- Shapiro-Stiglitz '84
  - Involuntary unemployment to deter shirking
  - Employment subsidy efficiency-improving
  - Assumes government cannot distinguish shirkers vs layed off persons: no government monitoring

- Holzner-Meier-Werding '10
  - Efficiency wage à la Shapiro-Stiglitz with endogenous monitoring by firms
  - Add workfare requirement for unemployed: cost of effort
  - Workfare weakens no-shirking condition
  - Increases employment and monitoring, raises profits, reduces gross wages, can be welfare improving

- Labor-turnover model (Stiglitz '74, Salop '79, Phelps '03)
  - Low-skilled have longer duration and higher unemployment rate
  - Employment subsidy financed by payroll tax: Hoon-Phelps '03, Phelps '94, '97, '03
  - Employment subsidy financed by UI voucher: Snower '94
Labour Supply: Fertility

Gahvari ’09

- Fertility generates two types of counteracting externalities
  1. Intergenerational transfer: higher fertility increases number of workers in future who will contribute to financing of pensions
  2. Capital dilution: Larger number of workers in future reduces capital-labour ratio, for given investment by current generation

- Corrected by child subsidy/tax or by linking pensions to number of children: If intergenerational transfer effect dominates, case for child subsidy

- Case not as strong when individuals do not perfectly control number of children or when quality varies

- If there is heterogeneity among parents in ability (or cost) to raise children, objective of internalizing the externalities will have to be balanced against redistributive objectives

- If there is imperfect control over fertility, will also be an insurance motive in government policy
Discussion and Other Issues

- Role of search models to characterize temporary unemployment vs long-term unemployment, and therefore insurance vs redistribution.

- Unemployment insurance: Redistribution role of UI versus efficiency: Possible correlation of self-insurance (and liquidity availability) with ability.

- Distinction between temporary unemployed vs displaced workers (who typically never recover previous earnings levels) vs those never employed: Again, combination of insurance and redistribution relevant, as well as training.

- Delivery of transfers via income tax system vs via standalone systems; self-reporting vs gatekeeping and ongoing monitoring (UI and welfare typically require layoff and search): Tagging/monitoring allows more effective insurance and better targeted transfers.
Treatment of different preferences for leisure: High preferences for leisure could be a) deserving, b) lazy, or c) exercising responsibility that should neither be rewarded or penalized (monitoring again important): Give very different policy prescriptions

More generally, heterogeneity of preferences an issue (risk, discounting, needs, etc.)

Behavioural issues and labour markets: Present bias and work effort, training, education, etc.

Happiness: Cost of unemployment; job satisfaction; status effects

Employment subsidy versus participation subsidy, and other active labour market policies
Discussion and Other Issues, ended

- Alternative information assumptions: tax evasion; presumptive taxation
- Underground economy
- Entrepreneurship
- Dynamic public finance: Uncertainty of wages &/or outcomes
- Commitment
- Occupational choice: attractive versus non-attractive jobs and bias of earnings (Albouy ’09)
- Aging
- Aggregate shocks
- Migration/immigration