The full-time employment tax

TheoryGuru applications

Load Economicreasoning package only if it is not already loaded

```
If[Length@Names["PLTools`*"] < 10,
 Get["http://economicreasoning.com"]]
```

Definitions

h_{notax} minimizes the non-tax average cost

```
defnontaxmin = ACwoTax[h_notax] ≤ ACwoTax[h];
```

Tax-inclusive average cost

```
ACwTax[h_] := ACwoTax[h] + FT[h] T / h
```

A full-time employment tax: is positive if and only iff a full-time schedule

```
FTcheck[h_] := {h ≤ 29 ⇒ FT[h] == 0, h > 29 ⇒ FT[h] == 1};
```

U-shaped nontax costs

```
UshapedNontaxCost =
  (h - h_notax) (29 - h_notax) > 0 ⇒ (ACwoTax[h] - ACwoTax[29]) (h - 29) (h - h_notax) > 0 || h == 29;
```

i.e., the sign of the correlation between h and AC depends on the sign of $h - h_{notax}$

Results

If the cost-minimizing schedule is part time without the tax, then

(a) the same schedule h_{notax} minimizes cost with the tax, and
(b) the minimized cost is not affected by the tax

```
TheoryGuru[{defnontaxmin, FTcheck[h], FTcheck[hnotax], hnotax ≤ 29, T > 0},
 ACwTax[hnotax] ≤ ACwTax[h] &&
  ACwTax[hnotax] == ACwoTax[hnotax]]
```

```
True
```

```
Column[Flatten[{FTcheck[h], FTcheck[hnotax]}]]
```

```
h ≤ 29 ⇒ FT[h] == 0
h > 29 ⇒ FT[h] == 1
hnotax ≤ 29 ⇒ FT[hnotax] == 0
hnotax > 29 ⇒ FT[hnotax] == 1
```

If the cost-minimizing schedule is full time without the tax, then the cost-minimizing schedule with the tax could be longer still

```
TheoryGuru[{defnontaxmin, FTcheck[h], FTcheck[hnotax], T > 0},
 ACwTax[hnotax] > ACwTax[h] && h > hnotax > 29]
```

```
True for some, False for others
```

Any schedule *h* must fall in one of three categories:
(a) it has no less cost than h_{notax},
(b) it part time and achieves lower cost than full-time h_{notax}, or
(c) it achieves less cost than full-time h_{notax} at a longer schedule

```
TheoryGuru[{defnontaxmin, FTcheck[h], FTcheck[hnotax], T > 0},
 ACwTax[hnotax] ≤ ACwTax[h] ||
  (ACwTax[hnotax] > ACwTax[h] && h ≤ 29 < hnotax) ||
  (ACwTax[hnotax] > ACwTax[h] && 29 < hnotax < h)]
```

```
True
```

Any schedule *h* that is less costly than h_{notax} cannot be in between 29 and h_{notax}.

```
TheoryGuru[
 {defnontaxmin, FTcheck[h], FTcheck[hnotax], ACwTax[h] < ACwTax[hnotax], T > 0},
 29 < h < hnotax]
```

```
False
```

Assuming U-shaped nontax AC, any part-time schedule h achieving lower cost than the full-time h_{notax} must either be:
(a) 29 hours per week, or

(b) not achieving the global minimum AC

```
TheoryGuru[{h ≤ 29 < hnotax, UshapedNontaxCost},
 h == 29 || (ACwoTax[h] > ACwoTax[29])]
```

```
True
```

Version 2: The above is enough because cost rankings of part-time schedules do not depend on the FTET. But, to make it more explicit:

```
TheoryGuru[{0 < h ≤ 29 < hnotax, UshapedNontaxCost,
   FTcheck[h], FTcheck[29]},
 h == 29 || (ACwTax[h] > ACwTax[29])]
```

```
The variable {True} is isolated and irrelevant to the conclusions.
Assumption 8 was therefore dropped.
True
```

Version 3: Because the schedules' comparisons with 29 hours are assumed directly, FTcheck is unnecessarily verbose:

```
TheoryGuru[{0 < h ≤ 29 < hnotax, UshapedNontaxCost,
   FT[h] == FT[29] == 0},
 h == 29 || (ACwTax[h] > ACwTax[29])]
```

```
True
```

Variable interpretations