

(* step one is to define the
 functions: (i) the variables we have are
 {ka0,ka,al,z,wbar,dl} (ii) {cbar,what} satisfy the
 condition that {V'[cbar]==0,R[what-cbar]== what}
 (iii) we want the condtion that {what<wbar}

In[]:= Quit[]

In[]:= Rfunction = {al Sqrt[w + z] - al Sqrt[z], al Sqrt[wbar + z] - al Sqrt[z] + (w - wbar) / dl};

V[c_] := ka0 Sqrt[c]

Vm[c_] := ka Sqrt[c]

R[w_] := Piecewise[{ {al Sqrt[w + z] - al Sqrt[z], w ≤ wbar},
 {al Sqrt[wbar + z] - al Sqrt[z] + (w - wbar) / dl, w > wbar} }]

cbar =

$$\frac{ka0^2}{4};$$

$$what = \frac{1}{2} \left(al^2 - \sqrt{al^2 \left(-ka0^2 + \left(al - 2\sqrt{z} \right)^2 \right)} - 2 al \sqrt{z} \right);$$

$$wbar = \frac{al^2 dl^2}{4} - z;$$

Rcons[w_] := al Sqrt[wbar + z] - al Sqrt[z] + (w - wbar) / dl

In[]:= w /. Solve[w - c == wbar /. Solve[Rcons[w - c] == w, c][[1]], w][[1]]

$$Out[]:= \frac{1}{2} \left(al \sqrt{al^2 dl^2} - 2 al \sqrt{z} \right)$$

$$In[]:= wthreshold = \frac{1}{2} \left(al \sqrt{al^2 dl^2} - 2 al \sqrt{z} \right);$$

In[]:= dl = 8 / 10; al = 30 / 10; z = 1; ka0 = 1 / 2; ka = 52 / 100;

In[]:= FullSimplify[Solve[Flatten[

{Simplify[{V'[cbar] == 1, FullSimplify[R[what - cbar] == what, what - cbar < wbar]}],

Simplify[D[Rfunction[[1]], w] == D[Rfunction[[2]], w] /. w → wbar]}],

{cbar, what, wbar}][[1]]]

Out[]:= {True, True, True}

$$In[]:= cbar = \frac{ka0^2}{4};$$

$$what = \frac{1}{2} \left(al^2 - \sqrt{al^2 \left(-ka0^2 + \left(al - 2\sqrt{z} \right)^2 \right)} - 2 al \sqrt{z} \right);$$

$$wbar = \frac{al^2 dl^2}{4} - z;$$

(* step two: find the right variables:
ignore for this set of variables.

(* step three: code for the market:

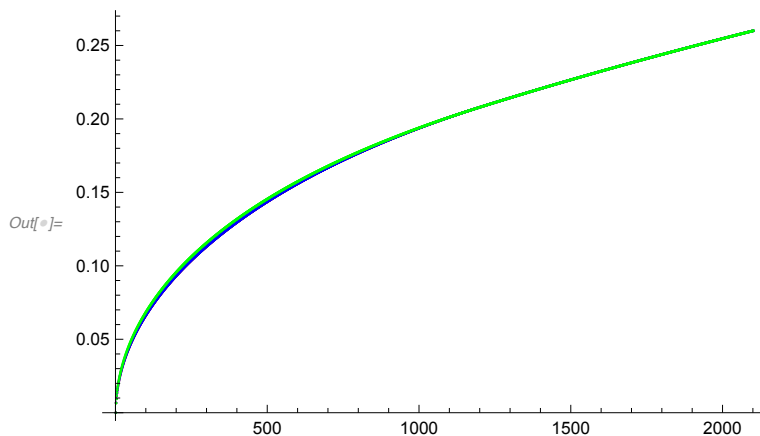
```
In[ ]:= wupper0 = wthreshold; wupper = R[R[wthreshold]]; grid = 1/2000;
wealth = Table[w, {w, 0, wupper + grid, grid}];
stationc = Flatten[ParallelTable[
  c /. Solve[R[wealth[[i]] - c] == wealth[[i]], c], {i, 1, Length[wealth]}]];

In[ ]:= Pm0 = ParallelTable[Vm[N[stationc[[i]]]], {i, 1, Length[wealth]}];
Pm = ParallelTable[Vm[N[stationc[[i]]]], {i, 1, Length[wealth]}];

(* i can try to improve this code. in particular,
how to get the continuation payoff.)

In[ ]:= Pmplus = Flatten[{ParallelTable[N[Max[
  Table[{1 - dl, dl}.{Vm[wealth[[i]]], {(wealth[[IntegerPart[N[R[wealth[[j]]] -
    wealth[[i]]]]/grid] + 2]} - N[R[wealth[[j]] - wealth[[i]]]} /
    (wealth[[IntegerPart[N[R[wealth[[j]]] - wealth[[i]]]]/grid] + 2]} -
    wealth[[IntegerPart[N[R[wealth[[j]]] - wealth[[i]]]]/grid] + 1]]),
    (N[R[wealth[[j]]] - wealth[[i]]] - wealth[[IntegerPart[
      N[R[wealth[[j]]] - wealth[[i]]]]/grid] + 1]])) /
    (wealth[[IntegerPart[N[R[wealth[[j]]] - wealth[[i]]]]/grid] + 2]} -
    wealth[[IntegerPart[N[R[wealth[[j]]] - wealth[[i]]]]/grid] + 1]]).
    {Pm[[IntegerPart[N[R[wealth[[j]]] - wealth[[i]]]]/grid] + 1]],
    Pm[[IntegerPart[N[R[wealth[[j]]] - wealth[[i]]]]/grid] + 2]]}],
  {i, 1, j}]], {j, 1, wupper0/grid + 1}],
Pm[[Length[Table[j, {j, 1, wupper0/grid + 1}]] + 1
;;
Length[wealth]]]]];

In[ ]:= ListPlot[{Pm0, Pm, Pmplus}, PlotStyle -> {Red, Blue, Green}]
```



```

In[ ]:= n = 1;
While[n < 25, Pm = Pmplus;
  Pmplus = Flatten[{ParallelTable[N[Max[
    Table[{1 - dl, dl}.{Vm[wealth[[i]]], {(wealth[[IntegerPart[N[R[wealth[[j]] -
      wealth[[i]]]]]/grid] + 2]] - N[R[wealth[[j]] - wealth[[i]]]])/
    (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]]/grid] + 2]] -
      wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]]/grid] + 1]]),
    (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[IntegerPart[
      N[R[wealth[[j]] - wealth[[i]]]]]/grid] + 1]])/
    (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]]/grid] + 2]] -
      wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]]/grid] + 1]]).
    {Pm[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]]/grid] + 1]],
    Pm[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]]/grid] + 2]]}],
    {i, 1, j}]], {j, 1, wupper0/grid + 1}], Pm[
  Length[Table[j, {j, 1, wupper0/grid + 1}] + 1 ;; Length[wealth]]]]];
  n++]

```

```

In[ ]:= Beep[]

```

```

In[ ]:= {Max[Pmplus - Pm], Min[Pmplus - Pm], Max[Pmplus - Pm0]}

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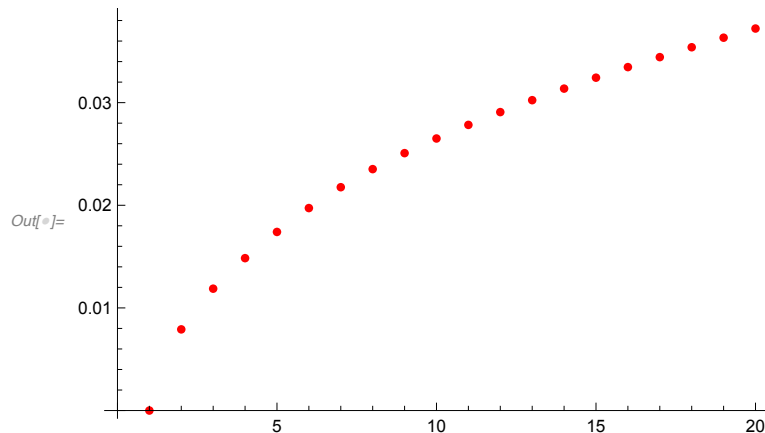
Out[ ]:= {5.96137 × 10-6, -2.86404 × 10-12, 0.0104276}

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In[ ]:= ListPlot[{Pmplus[[1 ;; 20]]}, PlotStyle → {Red, Blue}]

```



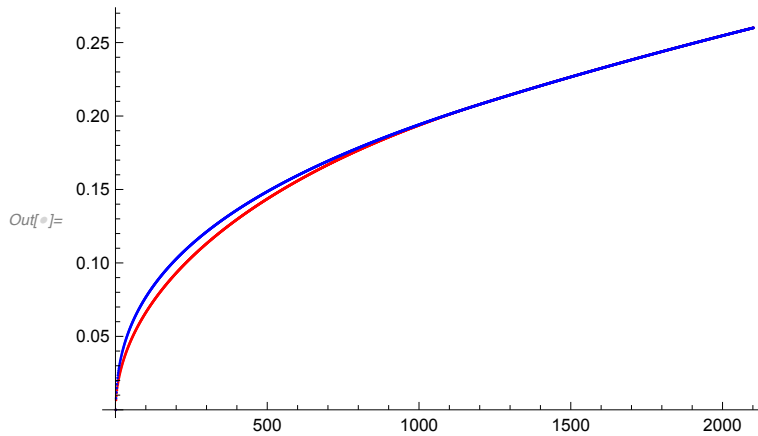
```

In[ ]:= (* the first two shall be close to zero, the last one shall be above zero.)

```



```
In[ ]:= ListPlot[{Pm0, Pmplus}, PlotStyle -> {Red, Blue}, PlotRange -> All]
```



(* find the position of updated wealth!

```
In[ ]:= ParallelTable[Position[Table[{1 - dl, dl}.{Vm[wealth[[i]]],
  {(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] -
    N[R[wealth[[j]] - wealth[[i]]]])/
    (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] -
    wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]]),
  (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[
    IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]])/
    (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] -
    wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]])},
  {Pm[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1],
  Pm[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]}],
{i, 1, j}, Max[Table[{1 - dl, dl}.{Vm[wealth[[i]]],
  {(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] -
    N[R[wealth[[j]] - wealth[[i]]]])/
    (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] -
    wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]]),
  (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[
    IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]])/
    (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] -
    wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]])},
  {Pm[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1],
  Pm[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]}],
{j, 1, wupper0/grid + 1}]

Out[ ]:= {{{1}}, {{1}}, {{1}}, {{1}}, {{1}}, {{2}}, {{2}}, {{2}}, {{2}}, {{2}}, {{2}}, {{2}},
  {{2}}, {{2}}, {{2}}, {{2}}, {{2}}, {{3}}, {{3}}, {{3}}, {{3}}, {{3}}, {{3}}, {{3}},
  {{3}}, {{3}}, {{4}}, {{4}}, {{4}}, {{4}}, {{4}}, {{4}}, {{4}}, {{4}}, {{4}}, {{4}},
  {{5}}, {{5}}, {{5}}, {{5}}, {{5}}, {{5}}, {{5}}, {{5}}, {{6}}, {{6}}, {{6}},
  {{6}}, {{6}}, {{6}}, {{6}}, {{6}}, {{7}}, {{7}}, {{7}}, {{7}}, {{7}}, {{7}},
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[illegible]

[illegible]

[illegible]

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In[•]:= consumecity = Flatten[%]
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[illegible]

[illegible]


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233, 233, 234, 234, 234, 235, 235, 235, 236, 236, 236, 237, 237, 237, 238, 238,
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316, 316, 316, 317, 317, 317, 318, 318, 318, 319, 319, 319, 320, 320, 320, 321];

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```
ln[*]:= wealhtmcrcity =
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Table[IntegerPart[N[R[wealth[[j]] - wealth[[consumecity[[j]]]]]]/grid] + 1,
{j, 1, wupper0/grid + 1}]

```

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wealhtmcrcity = {1, 2, 3, 5, 6, 6, 8, 9, 11, 12, 14, 15, 17, 18, 20, 21, 23, 23, 24, 26, 27,
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[illegible]

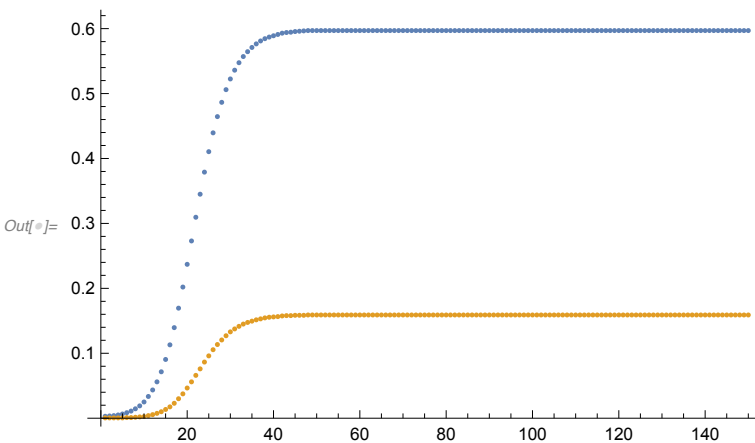
```
ln[*]:= wealthseqvalue = Table[wealth[[wealthseq[[j]]]], {j, 1, 150}]
```

[illegible]

```
In[*]:= consumeseqvalue = Table[wealth[[consumecity[[wealthseq[[j]]]]]], {j, 1, 150}]
```

[illegible]

```
ln[•]:= ListPlot[{wealthseqvalue[[1 ;; 150]], consumeseqvalue[[1 ;; 150]]}]
```


$$In[\bullet] := \text{Pmp lus}$$

```
ln[6]: Pmplus = {0., 0.007908500202567217, 0.011873743822232698,
0.014847028241141659, 0.01740184602074604, 0.01972735671734582,
0.021759739575949684, 0.02352187033875697, 0.025080157082215334,
0.02650575827916678, 0.027831608766315075, 0.02907904826270365,
0.030239684152095166, 0.03136684618563717, 0.03243150579786429,
```

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 0.07465768187801962`, 0.07499916242517131`, 0.07533703776441308`,
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 0.08138726349892945`, 0.08168808105259195`, 0.08198683138308707`,
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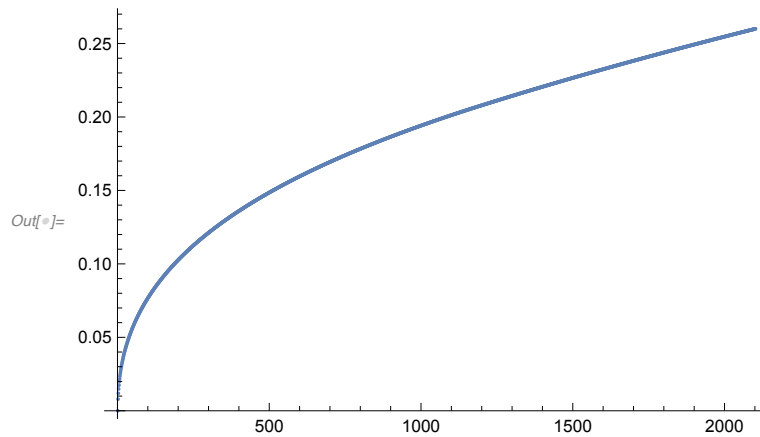
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```

```
In[ ]:= ListPlot[Pmplus]
```



(* step four: code for the community:

```

In[ ]:= wupper0 = R[what]; wupper = R[R[what]]; grid = 1/2000;
wealth = Table[w, {w, 0, wupper + grid, grid}];
stationc = Flatten[ParallelTable[
    c /. Solve[R[wealth[[i]] - c] == wealth[[i]], c], {i, 1, Length[wealth]}]];
Pmplus = Pmplus[[1 ;; Length[wealth]]];

In[ ]:= Ps0 = ParallelTable[N[Max[V[cbar], Pmplus[[i]]]], {i, 1, Length[Pmplus]}];
Ps = ParallelTable[N[Max[V[cbar], Pmplus[[i]]]], {i, 1, Length[Pmplus]}];

```

```

In[ ]:= Timing[
  Psplus = Flatten[{ParallelTable[N[Max[Table[{1 - dl, dl}.{V[wealth[[i]] + b] - b /.
    If[wealth[[i]] < cbar, b → Min[cbar - wealth[[i]], dl / (1 - dl)
      ({(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] +
        2]] - N[R[wealth[[j]] - wealth[[i]]]] / (wealth[[
          IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]] -
          wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] /
            grid] + 1]]), (N[R[wealth[[j]] - wealth[[i]]]] -
            wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] /
              grid] + 1]] / (wealth[[IntegerPart[N[R[wealth[[j]] -
                wealth[[i]]]] / grid] + 2]] - wealth[[IntegerPart[
                  N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]).
        {Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]],
          Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]]} -
        {(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] /
          grid] + 2]] - N[R[wealth[[j]] - wealth[[i]]]] /
          (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] /
            grid] + 2]] - wealth[[IntegerPart[
              N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]),
          (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[IntegerPart[
            N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]] /
            (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] /
              grid] + 2]] - wealth[[IntegerPart[
                N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]).
          {Pmplus[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] /
            grid] + 1]], Pmplus[[IntegerPart[N[R[wealth[[j]] -
              wealth[[i]]]] / grid] + 2]]} + cbar / 8], b → 0],
        {(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] +
          2]] - N[R[wealth[[j]] - wealth[[i]]]] /
          (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]] -
            wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]),
          (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[IntegerPart[
            N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]] /
            (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]] -
              wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]).
          {Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]],
            Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]]},
          {i, 1, j}}], {j, 1, wupper0 / grid}], Pmplus[[
Length[Table[j, {j, 1, wupper0 / grid}]] +
  1 ;; Length[
    wealth]]]]];]

```

```
Out[8]= {15.4853, Null}
```

```
In[9]:= Timing[
  n = 1;
  While[n < 40,
    Ps = ParallelTable[Max[Pstus[[i]], Pmplus[[i]]], {i, 1, Length[Pmplus]};
    Pstus = Flatten[{ParallelTable[
      N[Max[Table[{1 - dl, dl}.{V[wealth[[i]] + b] - b /. If[wealth[[i]] < cbar,
        b → Min[cbar - wealth[[i]], dl / (1 - dl) ({(wealth[[
          IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2)] -
          N[R[wealth[[j]] - wealth[[i]]]] / (wealth[[IntegerPart[
            N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2)] - wealth[[
            IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]],
        (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[IntegerPart[
          N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]]) /
        (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] /
          grid] + 2]] - wealth[[IntegerPart[
            N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]])}.{Ps[[
          IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]],
        Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]]] -
        {(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] /
          grid] + 2]] - N[R[wealth[[j]] - wealth[[i]]]] /
          (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] /
            grid] + 2]] - wealth[[IntegerPart[
              N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]]),
        (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[IntegerPart[
          N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]]) /
        (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] /
          grid] + 2]] - wealth[[IntegerPart[
            N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]])}.
        {Pmplus[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] /
          grid] + 1]], Pmplus[[IntegerPart[N[R[wealth[[j]] -
            wealth[[i]]]] / grid] + 2]]] + cbar / 8], b → 0],
      {(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] +
        2]] - N[R[wealth[[j]] - wealth[[i]]]] /
        (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]] -
          wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]]),
        (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[IntegerPart[
          N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]]) /
        (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]] -
          wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]])}.
        {Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]],
```



```

      Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]]],
      {i, 1, j}]]], {j, 1, wupper0/grid}], Pmplus[[
Length[Table[j, {j, 1, wupper0/grid}]] +
1 ;; Length[
wealth]]]]];
n++]

```

Out[8]= {472.956, Null}

```

In[9]:= Psplus = Table[Max[Psplus[[i]], Pmplus[[i]]], {i, 1, Length[Pmplus]}];
In[9]:= Ps = Psplus;
(* we want to define a point call selection: this is our wstar
In[9]:= ListPlot[{Pmplus, Psplus}, PlotStyle -> {Red, Blue}]

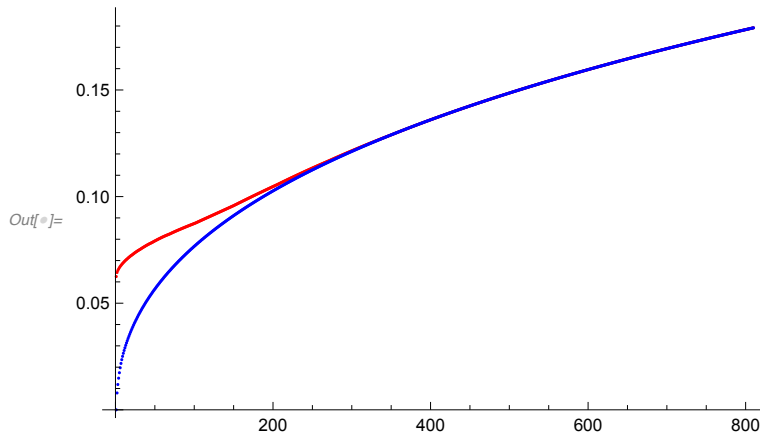
```

Out[9]= {349, 349}

Out[9]= 349

Out[9]= {0., 0.}

```
In[ ]:= ListPlot[{Psplus, Pmplus}, PlotStyle -> {Red, Blue}]
```



```
In[ ]:= Pmplus
```

```
Out[ ]:= {0., 0.0079085, 0.0118737, 0.014847, 0.0174018, 0.0197274, 0.0217597, 0.0235219,
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```

```
ln[8]:= Ps = Psplus;
```

(* step five: wealth dynamics

```
ln[9]:= priceupdate = Flatten[
  Table[Position[Table[{1 - dl, dl}.{V[wealth[[i]] + b] - b /. If[wealth[[i]] < cbar,
    b → Min[cbar - wealth[[i]], dl / (1 - dl)
    ({(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]] -
      N[R[wealth[[j]] - wealth[[i]]]]) / (wealth[[IntegerPart[
        N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]] - wealth[[
          IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]),
      (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[IntegerPart[
        N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]])) /
      (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] /
        grid] + 2]] - wealth[[IntegerPart[
          N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]])]}.
      {Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]],
        Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]]} -
      {(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]] -
        N[R[wealth[[j]] - wealth[[i]]]]) / (wealth[[IntegerPart[
          N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]] - wealth[[
            IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]),
        (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[IntegerPart[
          N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]])) /
        (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] /
          grid] + 2]] - wealth[[IntegerPart[
            N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]])]}.{Pmplus[[
          IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]],
          Pmplus[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] +
            2]]]} + cbar / 8, b → 0],
    {(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]] -
      N[R[wealth[[j]] - wealth[[i]]]]) /
      (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 2]] -
        wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]]),
      (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[
        IntegerPart[N[R[wealth[[j]] - wealth[[i]]]] / grid] + 1]])) /
```

```

(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] -
  wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]])]}.
{Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]],
  Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]]]},
{i, 1, j}], Max[Table[{1 - dl, dl}.{V[wealth[[i]] + b] - b /.
  If[wealth[[i]] < cbar, b → Min[cbar - wealth[[i]], dl / (1 - dl)
    ({(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] -
      N[R[wealth[[j]] - wealth[[i]]]]) / (wealth[[IntegerPart[
        N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] - wealth[[
          IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]]),
      (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[IntegerPart[
        N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]])) /
      (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/
        grid] + 2]] - wealth[[IntegerPart[
          N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]])]}.
    {Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]],
      Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]]} -
    {(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] -
      N[R[wealth[[j]] - wealth[[i]]]]) / (wealth[[IntegerPart[
        N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] - wealth[[
          IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]]),
      (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[IntegerPart[
        N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]])) /
      (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/
        grid] + 2]] - wealth[[IntegerPart[
          N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]])]}.{Pmplus[[
        IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]],
        Pmplus[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/
          grid] + 2]])} + cbar/8], b → 0],
  {(wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] -
    N[R[wealth[[j]] - wealth[[i]]]]) /
    (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] -
      wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]]),
    (N[R[wealth[[j]] - wealth[[i]]]] - wealth[[IntegerPart[
      N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]])) /
    (wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 2]] -
      wealth[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]])]}.
  {Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] + 1]],
    Ps[[IntegerPart[N[R[wealth[[j]] - wealth[[i]]]]/grid] +
      2]]]}, {i, 1, j}]], {j, 1, wsel}]]

```


[illegible]

```
ln[*]:= wealthupdate = Table[N[R[wealth[[j]] - wealth[[priceupdate[[j]]]]]], {j, 1, wsel}]
```

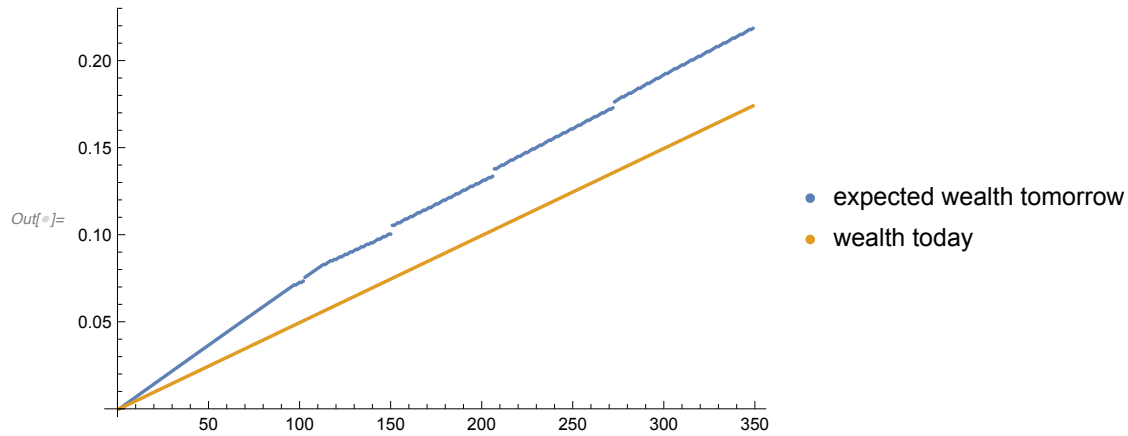
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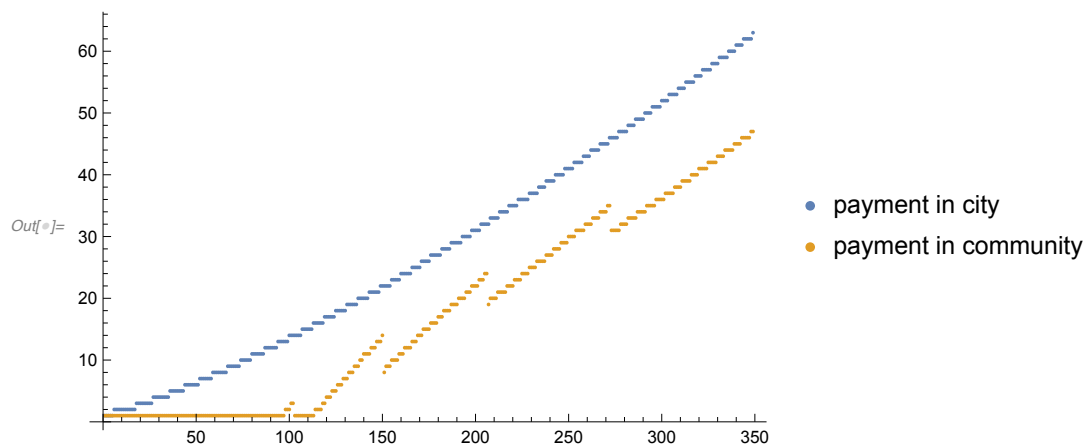
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```

```
In[ ]:= ListPlot[{wealthupdate, wealth[[1 ;; wsel]]},  
PlotLegends → {"expected wealth tomorrow", "wealth today"}]
```



```
In[ ]:= ListPlot[{consumecity[[1 ;; Length[priceupdate]]], priceupdate},  
PlotLegends → {"payment in city", "payment in community"}]
```



```

In[ ]:= bupdate = Table[b /. If[wealth[[priceupdate[[j]]]] < cbar,
  b → Min[cbar - wealth[[priceupdate[[j]]]], d1 / (1 - d1)
    ({(wealth[[IntegerPart[N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] /
      grid] + 2)] - N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]) /
      (wealth[[IntegerPart[N[R[wealth[[j]]] - wealth[[priceupdate[[
        j]]]]]] / grid] + 2)] - wealth[[IntegerPart[
          N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] / grid] + 1)]),
    (N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]] - wealth[[IntegerPart[
      N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] / grid] + 1)] /
      (wealth[[IntegerPart[N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] /
        grid] + 2)] - wealth[[IntegerPart[
          N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] / grid] + 1)]),
    {Ps[[IntegerPart[N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] /
      grid] + 1]], Ps[[IntegerPart[
        N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] / grid] + 2]]] -
    {(wealth[[IntegerPart[N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] /
      grid] + 2)] - N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]) /
      (wealth[[IntegerPart[N[R[wealth[[j]]] - wealth[[priceupdate[[
        j]]]]]] / grid] + 2)] - wealth[[IntegerPart[
          N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] / grid] + 1)]),
    (N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]] - wealth[[IntegerPart[
      N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] / grid] + 1)] /
      (wealth[[IntegerPart[N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] /
        grid] + 2)] - wealth[[IntegerPart[
          N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] / grid] + 1)]),
    {Pmplus[[IntegerPart[N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] /
      grid] + 1]], Pmplus[[
        IntegerPart[N[R[wealth[[j]]] - wealth[[priceupdate[[j]]]]]] /
        grid] + 2]]] + cbar / 8], b → 0], {j, 1, wsel}]

```

```
pupdate = Table[wealth[[priceupdate[[j]]]], {j, 1, wsel}]
```

```
cupdate = pupdate + bupdate
```

```

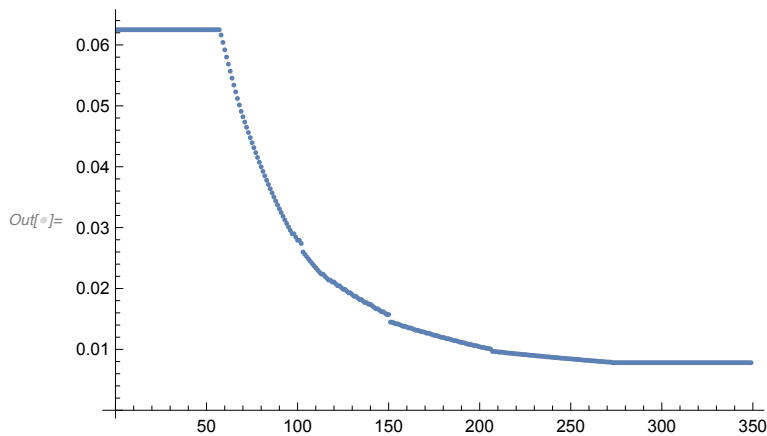
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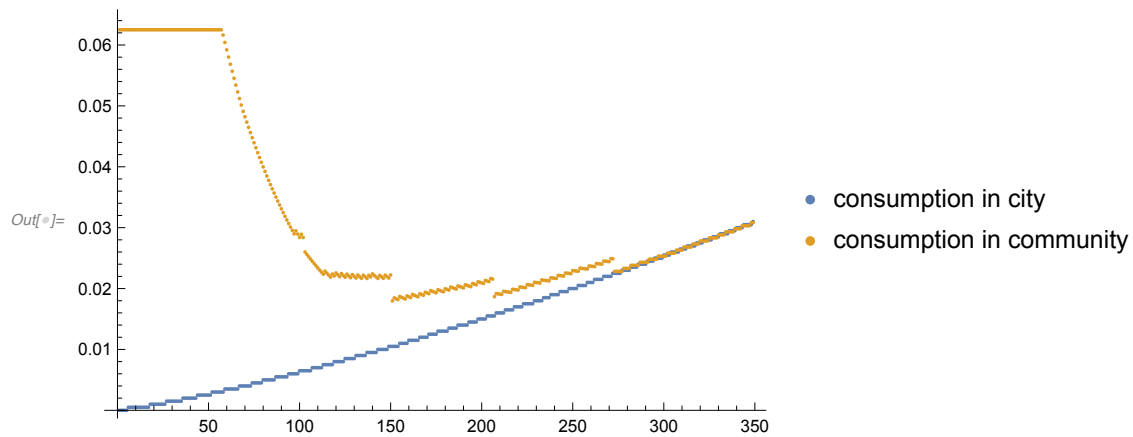

[illegible]

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```
In[•]:= ListPlot[bupdate]
```


$$In[\bullet] := \text{bupdate}$$
[illegible]


```
In[ ]:= ListPlot[{Table[wealth[[consumecity[[i]]]], {i, 1, Length[cupdate]}], cupdate},
  PlotLegends -> {"consumption in city", "consumption in community"}]
```



```
In[ ]:= wtre = Max[Position[Table[wealthupdate[[j]] > wealth[[j]], {j, 1, wsel}], True]]
```

Out[]:= 349

```
In[ ]:= Length[wealthupdate]
```

Out[]:= 349

```
In[ ]:= {N[{wealth[[wtre]], wealthupdate[[wtre]]}]}
```

Out[]:= {{0.174, 0.21854}}

+++++