Answer

We do not want to put a fairness requirement on $p2a$ because we do not want to require the producer ever to receive a message. (If we put a "-" after the label $p1$, so there is no fairness requirement on $p1$, then it doesn't matter if we have a fairness requirement on $p2a$ because the producer can halt at $p1$.) We need to require fairness of $p2b$ because, once $\overline{buf}$ and $\overline{in}$ have changed, implementing liveness of $FGBBuf$ requires that the process execute $p2b$ and then $p3$.