

Extended Abstract

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Paper/Poster Title	Economic and poverty-related effects of capsid invasion and the effectiveness of the Cocoa Diseases and Pests Control Program in rural Ghana.
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Abstract prepared for presentation at the 98th Annual Conference of The Agricultural Economics Society will be held at The University of Edinburgh, UK, 18th - 20th March 2024.

Abstract	200 words max
<p>Despite scholarly attention given to cocoa production in Ghana, the sector is constrained by numerous challenges leading to low outputs and welfare of farmers. One key challenge is the invasion of capsid, which affects cocoa yield posing serious economic and poverty-related concerns. In response to this threat, the Cocoa Marketing Board, introduced the codapec policy, a government subsidy program aimed at supporting farmers in fighting capsid through mass spraying and other agronomic activities. Despite the economic and immense investment in codapec, little rigorous studies quantifying the economic and poverty-related effects and the effectiveness of the policy exist. We analyze the effect of capsid along three dimensions: yield, income and poverty and an ex-post assessment of the effectiveness of codapec. We leverage on a unique household survey covering cocoa growing regions in Ghana. We find that capsid invasion reduces yield, cocoa income, and per-capita income. We also find that capsid attack increases the probability of households falling below the poverty line, poverty gap, and poverty severity. Our estimated effects remain robust across several specifications and omitted variables. We also provide evidence that farmers who receive codapec tend to increase their yield and reduces their probability of falling below the poverty line.</p>	
Keywords	Capsid, CODAPEC, poverty gap, poverty severity, cocoa
JEL Code	Q180 Agricultural Policy; Food Policy; Animal Welfare Policy www.aeaweb.org/jel/guide/jel.php?class=Q
Introduction	100 – 250 words
<p>The benefits of cocoa production especially in West Africa has received numerous scholarly attentions. As an export-oriented crop, it is a major source of foreign revenue for the government of most West African countries. At the same time, cocoa production presents a credible pathway to alleviating poverty for rural households through employment and income gains. However, like many other crops cultivated in West Africa, cocoa production is constraint by a plethora of challenges leading to low outputs and poor welfare of farmers. One key challenge is the invasion of ecological shock called capsid. In Ghana, capsid affects cocoa yield posing serious economic and poverty-related concerns. Further exacerbating their effects and the infestation is the conducive climatic conditions in cocoa growing regions in Ghana. In response to this threat, the Cocoa Marketing Board (Cocobod), introduced the codapec policy, a government subsidy program aimed at supporting farmers in fighting capsid infection through cocoa mass spraying and other agronomic activities. Despite the economic effects and immense investment in the codapec support program, little rigorous empirical studies quantifying the economic and poverty related effects and the effectiveness of the codapec policy exist. Against this backdrop, we are interested in the effect of capsid attack on three dimensions of farm performance and farmer welfare. Also, we investigate whether receiving the codapec support, exacerbates or cushions farmers against capsid. Our objective is to contribute towards providing evidence-based research on the economic effects of capsid and the effectiveness of the codapec policy in rural Ghana.</p>	



Methodology	100 – 250 words
<p>In our empirical analysis, we explore three dimensions. The first dimension is to assess the effect of capsid on output related outcomes, coupled with the effectiveness of the codapec policy in cushioning cocoa farmers against capsid attack (yield cushioning effects). The second and third dimensions involve analyzing the effect of capsid and the codapec support on income and poverty indicators. Based on this we generate several outcome variables: yield, per-capita income, cocoa income, income poverty, poverty gap and poverty severity. To assess the effect of capsid shock on key outcome variables, we estimate an OLS and linear probability models with village fixed effects, hinging on the assumption that the spread of the capsid pest is spatio- random. To assess the effectiveness of the codapec support policy, we first apply a 2SLS and control function models, to ascertain if the interaction term of capsid attack and codapec support is endogenous. After this, we use an OLS, LPM, IV-probit and 2SLS regressions, to analyze whether receiving the codapec support either exacerbates sensitivity to capsid shock or mitigates capsid shock against key outcome variables. The use of different regression models such as LPM and OLS, IV-probit in the spirit of a control function approach and 2SLS, is necessitated by the different nature of our outcome variables. Lastly, exploring burgeoning studies highlighting the importance of social networks and neighbourhood effects, we propose the village codapec support rate as a valid instrument for our dummy codapec support variable.</p>	
Results	100 – 250 words
<p>Our results show that capsid attack possess serious yield, income and poverty threats. In particular, we find that the spread of capsid significantly reduces the yield of cocoa farmers by about 9.4 percentage points. Our results show that capsid shock is associated with huge negative economic effect of about US\$134 in terms of cocoa income. We find that capsid attack significantly reduces per-capita income by about US\$ 73. Switching to poverty related effects, cocoa households experiencing capsid invasion are 10% more likely to move below the poverty line (\$1.90 a day). Moreover, experiencing capsid attack is associated with an increase in poverty gap by approximately 5% while further increasing poverty severity by about 4%. To robustify our results against omitted variables, we performed an Oster bound analysis. The results provide reassuring and reaffirms the stability of our estimated coefficients to selection on unobservables. Performing several validity and diagnostic tests on our proposed instrument, we find sufficient evidence that our instrument is strong and is likely to pass the exclusion validity criterion. However, we do not find sufficient information in the sample to assume our interaction term of capsid attack and codapec support dummy may be endogenous, using the Wald test of exogeneity from the IV-probit regression. From interesting insights gained from the OLS and LPM models, our results show that farmers who receive codapec support in the midst of capsid increase their yield by about 24%, while reducing their probability of falling below the poverty line by about 16%.</p>	
Discussion and Conclusion	100 – 250 words
<p>In our study. we analyze the economic and poverty effects of capsid attack on cocoa farmers. Also, we assess the role of the codapec support policy, a government policy geared towards reducing the impact of pest attack, in mitigating or exacerbating poverty, income and yield amidst capsid attack. Capsid attack poses immense threat to the quality and quantity of cocoa beans, while exacerbating poverty levels since cocoa is a major cash crop in rural Ghana. We argue that the spread of capsid is spatio-random, thus our estimation strategy is well suited to address any endogeneity concerns. Building on</p>	

burgeoning studies, we validate and address concerns regarding the possible endogeneity of receiving the codapec support policy and the interaction term of codapec and capsid attack. We document that capsid attack has both economic and statistically significant effect on cocoa yield, cocoa income and per-capita income of cocoa farmers. Second, we find that capsid attack has higher probability of pushing famers below the poverty line, while further worsening their poverty status by increasing their poverty gap and severity. The central finding from our analysis of the effectiveness of the codapec support is that farmers who receive such support tend to cushion themselves against these shocks. In particular, farmers tend to increase their yield and reduce their poverty status when they receive the codapec support. Our estimated results provide implications for policy and practice. The study underscores the importance of these policy support in helping farmers fight against pest and diseases.